

FEDERAL COMPUTER EQUIPMENT MARKET

1991-1996

INPUT

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**Federal Information Systems and Services
Program (FISSP)**

***Federal Computer Equipment Market,
1991-1991***


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Abstract

This report examines the federal computer equipment market. It identifies the federal agencies' requirements and the application areas supported by existing and planned computer systems.

INPUT believes that the federal computer equipment market will grow from \$5.9 billion in FY 1991 to \$8.7 billion in FY 1996, at a compound annual growth rate of 8%. In addition to the market forecast, this report describes the major market issues and trends impacting the industry. It also discusses the vendors' perspectives of the market.

This report contains 151 pages, including 76 exhibits.



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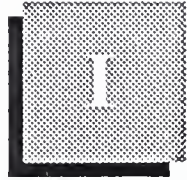
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Introduction



Computer equipment has become necessary in most federal agencies to perform a wide range of functions and activities. The federal information technology market has increased over the years, and with it the computer equipment market has also expanded. The government's ADP modernization efforts have increased with advances in technology, and will continue to increase in the future.

This report on the federal computer equipment market was prepared as part of INPUT's Federal Information Systems and Services Program (FISSP). The report's findings are based on research and analyses of several sources:

- INPUT's Procurement Analysis Reports (PARs)
- OMB/GSA/NBS Five-Year Information Technology Plans for 1991-1996
- Interviews with federal agency officials with active and planned computer equipment acquisitions
- Federal agency FY 1990 and FY 1991 information technology budgets
- Computer Intelligence's analysis of federal equipment inventory
- The *GSA Microcomputer Survey Report*
- CBD Search's analysis of federal contract awards

A

Purpose and Scope

This report responds, in part, to client requests for a detailed look at the federal hardware market. This report also serves to supplement INPUT's previous reports on systems integration and software and related services. It is intended to give INPUT's clients a clear description of the current status and future trends of the federal market. It also identifies key vendors in this market.

This report covers federal computer equipment in the 1991-1996 timeframe. It includes microcomputers, workstations, midsize computers, mainframes, and supercomputers. Areas of analysis include a market forecast, discussion of impacting trends, and identification of top federal computer equipment vendors.

B

Methodology

In developing this report, INPUT used a variety of sources and methods. First, INPUT researched agency long-range plans and budget submissions for GFY 1991-1996 for major systems replacements and new acquisitions. Based on this research, INPUT pinpointed agencies and programs that related to computer equipment.

INPUT also reviewed the Procurement Analysis Reports (PARs) to develop further insights on agency activities. Many PARs cover programs that, for one reason or another, do not appear in the agency budget submissions. This situation yields additional possibilities for further research.

A questionnaire was developed for agency officials (See Appendix F).

- The agency questionnaire was designed to acquire information about current experience and plans for future use of computer equipment.

Federal agency officials selected for interview included:

- Agency executives at the policy level
- Program managers

In developing the market forecast, INPUT relied on several sources. First, INPUT's proprietary budget model was consulted. This model consists of all combined agency budget submissions, with additions for off-budget items already identified and subtractions for items that INPUT believes will be delayed or cancelled. INPUT also relied on the federal inventory data provided by Computer Intelligence and GSA. Finally, INPUT took the survey responses into account in adjusting the forecast numbers.

C

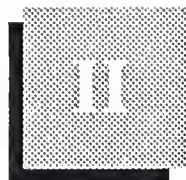
Report Organization

In addition to the introduction and appendixes, this report consists of five chapters:

- Chapter II contains an executive overview describing the major points and findings in the report.
- Chapter III provides the market forecast and describes the major market issues and trends impacting the industry.
- Chapter IV summarizes the federal agencies' requirements for computer equipment and the application areas supported by existing and planned systems.
- Chapter V presents the vendors' perspectives on the federal computer equipment market.
- Chapter VI provides a sample of business opportunities for programs and initiatives in the federal market involving computer equipment.

The following appendixes are also provided:

- Interview Profiles
- Definitions
- Glossary of Federal Acronyms
- Policies, Regulations, and Standards
- Related INPUT Reports
- Questionnaires



Executive Overview



A

Market Pressures

The federal market for computer equipment is expected to grow steadily over the next five years. Some of the pressures impacting this growth are listed in Exhibit II-1. Government programs require constant improvement in both quality and quantity of information technology support.

EXHIBIT II-1

Market Pressures

- Replace older systems
- Utilize and maintain prevalent technology
- Downsize applications
- Adjust to budgetary constraints
- Avoid system obsolescence

The federal government strives to remain in the forefront of technology, but in many cases still uses computers averaging 12 years old. Federal agencies are constantly upgrading or replacing old systems. This trend will continue through the 1990s as agencies attempt to reduce system obsolescence.

Downsizing applications to smaller systems will remain a factor in computer equipment acquisitions. As technology advances, applications typically run on larger computer systems can be more economically maintained on smaller machines. System integrators, software vendors, and hardware vendors will find downsizing playing a role in future federal procurements.

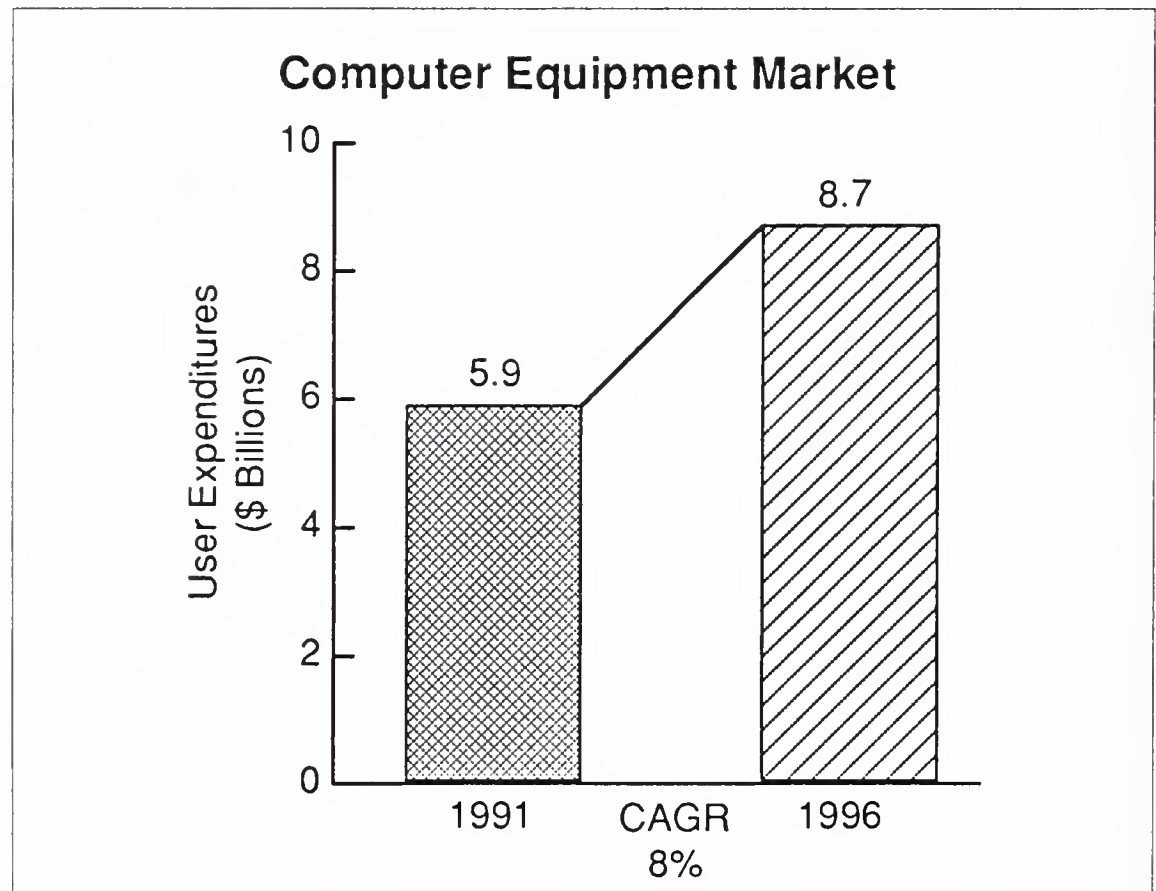
Because of downsizing and the need to use the most current technology available, the federal market for computer equipment should remain solid. However, budget constraints will cause spending in this area to increase at a slower rate than in previous years. The computer equipment market will remain price sensitive and become increasingly quality sensitive as well. More and more agencies are choosing contractors with the best quality for the lowest price rather than the lowest bidder.

B

Computer Equipment Market

INPUT estimates the federal computer equipment market will grow from \$5.9 billion in FY 1991 to \$8.7 billion in FY 1996, at a compound annual growth rate (CAGR) of 8%. Exhibit II-2 presents an overall market view, and Exhibit II-3 divides the market into the five subsets of computer equipment.

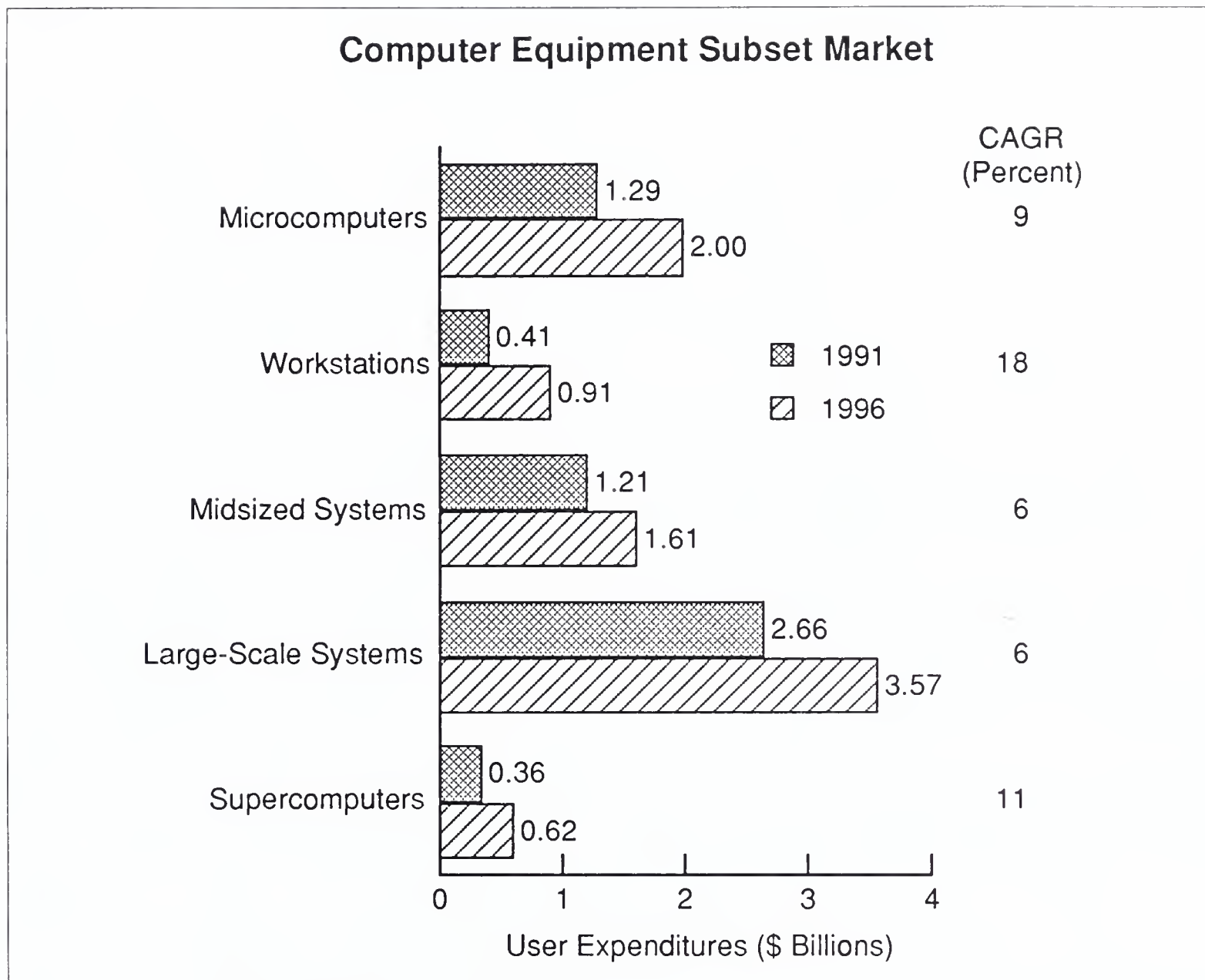
EXHIBIT II-2



Each category of computer equipment is characterized by different acquisition trends. The federal microcomputer market shows the most price sensitivity of the equipment subsets.

Workstations show the highest growth rate due to increased purchases by traditional users and increased use of workstations for non-traditional applications. INPUT projects that mid-sized computer systems spending will continue to grow, mainly due to downsizing from mainframes and budget constraints preventing some agencies from purchasing large-scale systems. However, most large agencies will continue to buy mainframes to replace older mainframes. INPUT expects supercomputer procurements to increase as well, as agencies find new applications for supercomputing equipment.

EXHIBIT II-3



C

Applications Mix

Exhibit II-4 lists the applications run on computer equipment, according to agency respondents. Word processing, electronic publishing, and project management dominate the applications run on microcomputers. Workstations, midsized systems, and supercomputers are most often used for scientific/engineering applications. According to survey respondents, the most frequently utilized mainframe applications involve communications, and logistics and distribution.

EXHIBIT II-4

Computer Equipment Applications

- Logistics and distribution
- Communications
- Word processing
- Electronic publishing
- Project management

INPUT expects scientific/engineering applications to be those most likely to be supported by additional computer equipment purchases. This prediction is based on agency responses to a user survey. Agencies believe word processing and administrative functions are also likely to require additional computer equipment.

D**Acquisition Criteria**

Agencies consider equipment performance and equipment reliability the most important characteristics when selecting computer equipment. Exhibit II-5 lists, in order of importance, selection criteria of agency respondents.

EXHIBIT II-5

Selection Criteria

- Equipment performance
- Equipment reliability
- Software features
- Vendor's support reputation
- Ease of implementation

Another issue gaining importance in computer equipment acquisitions is whether to buy new or used equipment. Agencies are now required to justify "new only" buys. The term "used equipment" applies to previously installed mainframes and minicomputer equipment, including reconditioned and refurbished items. Smaller systems, such as micros and workstations, become obsolete quickly, making this type of used equipment impractical. Used-equipment dealers may find a niche within the federal market that has not existed in the past.

E**Leading Vendors**

Exhibit II-6 lists the top 10 ADP equipment vendors for all federal agencies according to the value of the contracts they were awarded during FY 1988-FY 1990. The total value of ADP contracts awarded during this time period equaled \$8.1 billion. Seventy percent (70%) of these contracts were awarded to the top 30 vendors.

EXHIBIT II-6

**Leading Vendors by Contract Awards
FY 1988-FY 1990**

- | | |
|---------------------|----------------------------|
| • Unisys | • IBM |
| • DEC | • CSC |
| • Honeywell | • Zenith |
| • Wang Laboratories | • Cray Research |
| • AT&T | • Federal Data Corporation |

Zenith currently has the largest installation of microcomputers. INPUT expects the microcomputer distribution pattern to shift sharply over the next few years as a result of these pending awards: Air Force Desktop III, Army SMC, and Navy COMPANION. Low price is driving the federal microcomputer market.

Federal workstation installations are dominated by Sun. While various firms, including Hewlett-Packard, Digital, and IBM will make significant inroads into the workstation market, Sun will maintain its dominance.

Digital dominates the federal midsized computer market, and INPUT expects this to continue.

IBM will continue to dominate the mainframe market. Despite Congressional attempts to limit IBM-oriented specifications, agencies will continue buying IBM equipment.

Finally, INPUT expects Cray to continue dominance of the federal supercomputer market, though attempts are being made to open supercomputer competition to Japanese firms.

F**Recommendations**

In this competitive federal market for computer equipment, vendors need to adopt various strategies to succeed. INPUT's recommended strategies are set forth in Exhibit II-7.

EXHIBIT II-7

Recommendations

- Address system obsolescence
- Concentrate on equipment performance
- Focus on LANs and interconnected processing
- Be price sensitive in microcomputer market
- Target agencies with oldest computer equipment

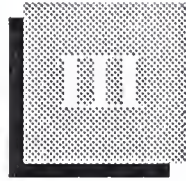
Federal users fight a never-ending battle against system obsolescence as technology continues to change. This problem is compounded by the slow and complex procurement process. One solution to this problem is to develop contingency plans within the contract allowing for upgrades of the system as technology advances. Prenegotiated upgrades may be referred to as engineering clauses or technology refreshments. Negotiating upgrades in the event of technological advances can give a contractor a competitive edge. This practice may become a necessity for certain procurements in the future.

Agencies, when surveyed, stressed the importance of equipment performance and reliability in the selection process. Vendors should consider the intended use of the computer equipment they are selling and continually test, evaluate and upgrade system performance. Agencies also expressed an interest in system reliability. Vendors concentrating on these two aspects of the product will develop a competitive advantage over the competition.

A survey by CI indicates that the federal government is the leading user of LAN technology. More than 50% of all government agencies have LANs installed. The popularity of LANs stems from the fact that government sites are usually large and consist of many work groups. Also, many agencies are downsizing applications from large computers to micros and workstations. This process leads to distributed processing which requires interconnections in order to communicate.

INPUT predicts that microcomputer acquisitions will be extremely price sensitive in the future. The low bidders will be the winners when it comes to microcomputer acquisitions in the next five years.

INPUT advises federal contractors and vendors to target agencies with the oldest installed computer equipment. Some agencies own computer equipment ranging from eight to sixteen years old. Systems obsolescence is always a problem, but with computer equipment over eight years old, replacing it almost becomes a necessity. The Department of Treasury and the Department of Labor operate with the oldest computer equipment, with an average age of sixteen years.



Market Analysis and Forecast

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This chapter outlines the market structure and provides the market forecast. In addition, it describes the major market issues and trends impacting the industry.

A

Market Structure

For the purposes of this study, INPUT divided the federal computer equipment market into five categories, as itemized in Exhibit III-1.

EXHIBIT III-1

Equipment Categories

- Supercomputers
- Large-scale systems
- Midsized systems
- Workstations
- Microcomputers

Supercomputers include those from Cray, Fujitsu, and the new IBM development effort. They have the following characteristics:

- Tens of millions to a billion or more calculations per second
- Vector versus scalar processing, enabling the operation on multiple numbers simultaneously
- Multiple central processing units with large, shared memory

- Multiple functional units to facilitate parallel arithmetic operations within each CPU
- Parallel processing on a CPU basis
- Costs exceeding \$5 million

The large-systems segment includes traditional mainframes, minisupercomputers, and supercomputers that have typical word lengths of 32 bits and configuration prices in excess of \$350,000. Examples of such systems include IBM 303X, 308X, and 309X, and computer systems that compete with these products, including systems from Hitachi, Amdahl, NCR, Unisys, CDC, and Bull.

Midrange systems describe superminicomputers and the more traditional business minicomputers. Due to steadily improving design and technology, the latter have outgrown traditional definitions (which defined small systems as providing 32-bit to 64-bit word lengths at prices ranging from \$15,000 to \$350,000). Increasingly, minicomputers and workstations meet the 32-bit definition, and many go beneath the \$15,000 lower price limit. Typical midrange systems include IBM System/3X, 43XX, AS/400, and 937X product lines, DEC PDP and VAX families (excluding MicroVAX families), and competitive products from a wide range of vendors, including HP, Data General, Wang, AT&T, Prime, Concurrent, Gould, Unisys, NCR, Bull, Harris, Tandem, Stratus, and many others.

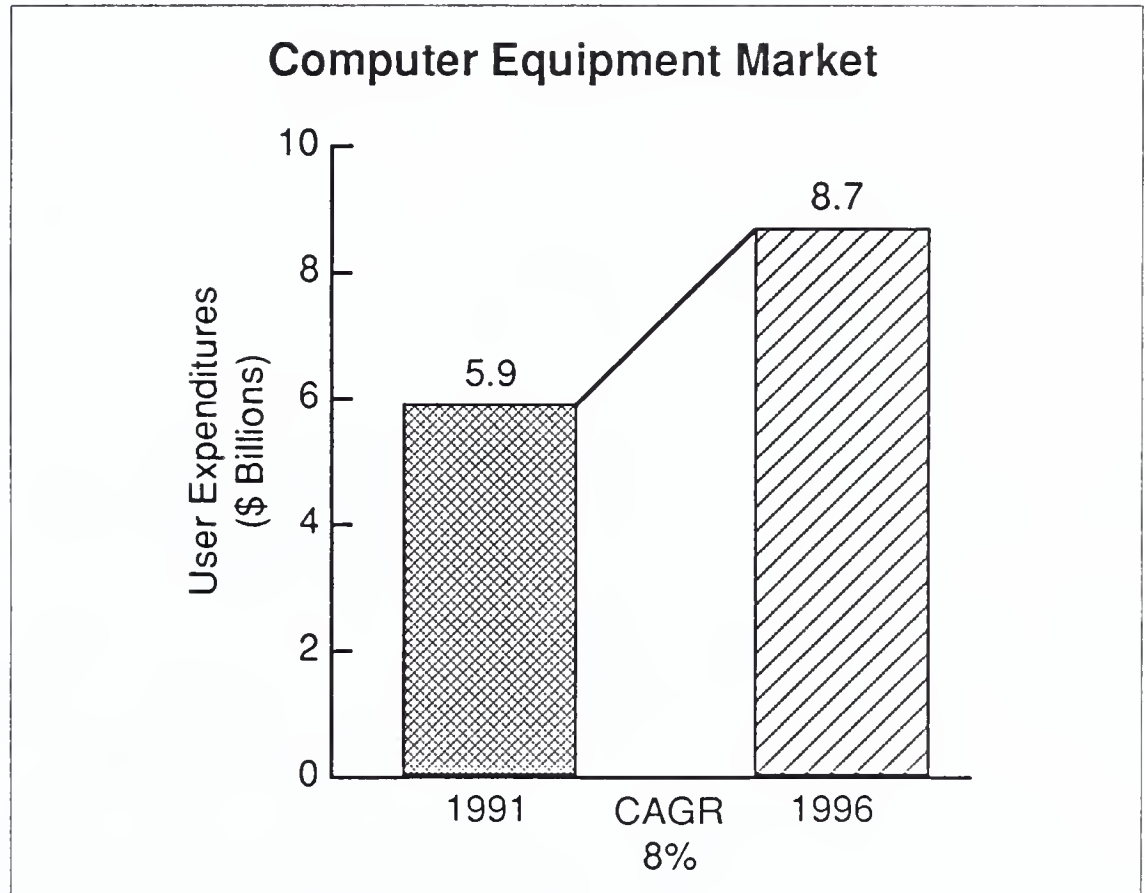
Workstations are high-performance, desktop, single-user computers employing (mostly) Reduced Instruction Set Computing (RISC). Workstations provide integrated, high-speed, local network-based services such as data base access, file storage and back-up, remote communications, and peripheral support. Typical workstation products are provided by Apollo (now a unit of Hewlett-Packard), Sun, Altos, DEC (the MicroVAX) and IBM. These products usually cost more than \$15,000. However, at this writing many companies have recently announced sizable price cuts.

Finally, microcomputers are primarily single-user units priced well below \$15,000. Most or all CPU, memory, and peripheral functions are combined on a single chip. With the exception of Apple's Macintosh and Commodore's Amiga, most popular microcomputers are based on INTEL chips. Apple and Commodore use Motorola chips for their processing. While IBM and Compaq are widely recognized market leaders, some leading clone manufacturers—including Dell, AST Research, and Everex—are beginning to have a major impact.

B**Market Forecast**

The federal computer equipment market grew from \$4.67 billion in FY 88 to \$5.78 billion in FY 90, at a compound annual growth rate (CAGR) of 11.5%. INPUT expects this market will grow at a slower rate in the next five years. INPUT estimates the federal computer equipment market will grow from \$5.9 billion in FY 91 to \$8.7 billion in FY 96, at a compound annual growth rate (CAGR) of 8%. Exhibit III-2 presents an overall market view, and Exhibit III-3 divides the market into the five components defined in Section III.A.

EXHIBIT III-2



Because of price/performance improvements, agencies are acquiring equipment at a steadily higher rate. Because of modernization efforts, however, agencies find that their equipment inventories continue to age. In a report issued in 1990, GSA compared federal and commercial inventories over a period of years. Exhibit III-4 summarizes the results of that study.

EXHIBIT III-3

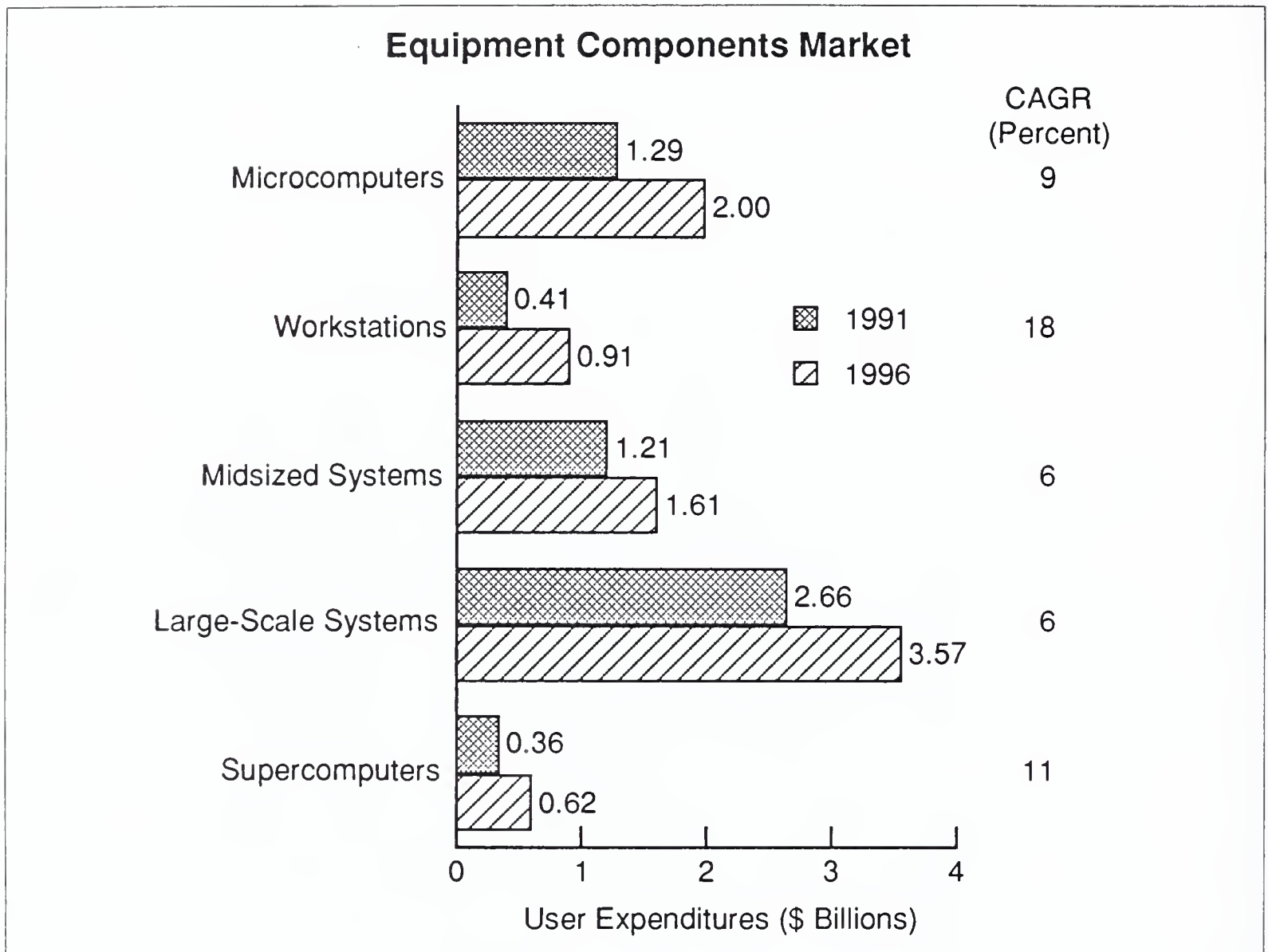


EXHIBIT III-4

Average Age of Computers

	Federal	Fortune 500
FY 84	10 years, 1 month	6 years, 3 months
FY 85	10 years, 3 months	4 years, 10 months
FY 86	10 years, 7 months	5 years, 5 months
FY 87	9 years, 8 months	7 years, 1 month
FY 88	9 years, 7 months	7 years, 1 month
FY 89	10 years, 5 months	6 years, 9 months

Source: *The Comparative Age of ADP Equipment: Federal Government and Private Sector*, issued by the General Services Administration in December 1990.

Computer obsolescence is still a serious problem in the government. Because of recent changes in the Federal Information Resource Management Regulations (FIRMRs) to the contrary, INPUT expects procurement problems to delay a solution to the computer obsolescence problems. As long as the process remains highly convoluted, computers will remain installed in government agencies longer than they should be.

The following discussions cover each of the five components of the federal equipment market:

1. Microcomputers

Acquisition in the federal microcomputer market is dominated by two types of contract vehicles. Every year, agencies buy hundreds of million dollars worth of microcomputers through GSA schedules. Additional hundreds of millions are obligated through indefinite delivery, indefinite quantity contracts such as:

- Desktop III
- Army Small Microcomputer Contract
- Navy COMPANION
- Treasury Departmental Microcomputer Acquisition II

These contracts lead to wide pricing swings on similar equipment. For example, it was reported that similarly equipped INTEL 386 chip-based microcomputers range from \$1,535 on the Desktop III contract to \$7,482 for a Compaq/25 on GSA schedule.

At this writing, INPUT's PAR data base includes more than 50 programs involving microcomputers. In most cases, however, agencies are showing a high degree of price sensitivity. Therefore, INPUT expects the market to continue growing while unit prices continue to tumble.

2. Workstations

The federal market for workstations is showing the highest growth rate among equipment categories. This situation is arising from several factors:

- Traditional workstation users, including the Energy Department and NASA, continue to increase their inventories.
- In INPUT's survey of agency users, as discussed in Chapter IV, agencies identified numerous non-traditional workstation applications, including such administrative areas as human resources and finance.
- Workstations are now serving critical roles in the management of high-speed federal networks.

- INPUT's PAR data base contains more than 40 programs that may involve workstations. Some programs are not definite candidates, however, since integrators may devise technical solutions which omit workstations.

3. Midsized Systems

For the past few years, it has been widely forecasted that midsized systems, the traditional minicomputers, would disappear from the federal market. INPUT does not share this viewpoint, for the following reasons:

- As GSA continues to discourage "*grand designs*," agencies will acquire more modest systems to meet their requirements in a more modular fashion.
- Many applications formerly performed only on mainframes are now being downsized to midsized systems. The concept of departmental computing is growing in popularity as organizations within an agency gain more control over their own resources.
- Many agencies are replacing remote computing services with local-area networks for microcomputers and midsized systems.
- Budget constraints have led many midsized agencies to conclude that mainframes have become too expensive. Faced with budget constraints, many agencies will opt for more cost-effective solutions, even if these solutions involve foregoing some functionality.
- INPUT's survey of agency users showed that virtually all major applications involve midsized systems.
- Finally, INPUT's PAR data base shows more than 30 programs involving midsized systems.

For these reasons, INPUT expects the federal market for midsized systems to continue growing.

4. Large-Scale Systems

Despite budget constraints and downsizing, virtually all large agencies continue to buy mainframe computers. In many cases, these involve replacement of increasingly older, obsolescent systems. These include such traditional mainframe sites as Veterans' Benefit centers, IRS service centers, and DCA WWMCCS sites. In addition, some agencies, such as the Air Force and NASA, are conducting requirements contracts for mainframes. The winning computers may become, at least in a partial sense, *de facto* standards for their agencies. Several other factors will help drive continued modest growth in the federal large-scale computer market:

- In an earlier survey, INPUT found that most agency respondents expected a majority of their equipment budgets to go toward large-scale systems.
- In the current survey, as shown in Chapter IV, agencies rated mainframes highest in popularity for most applications.
- INPUT's PAR data base shows more than 30 programs involving mainframes.

5. Supercomputers

Traditionally, federal agencies have used supercomputers for highly scientific and technical applications. As shown in Chapter V, NASA and the Department of Energy own the bulk of these systems. However, all the major DoD agencies have supercomputers installed in unclassified establishments. INPUT also believes the Defense Department employs supercomputers heavily for classified applications.

The Departments of Commerce and Transportation also use supercomputers, primarily for weather forecasting. Units are also installed at Health and Human Services and the Environmental Protection Agency. As federal computing becomes more complex, INPUT expects agencies to find new applications for supercomputers, thus fueling continued market growth. INPUT's PAR data base currently contains 20 programs involving supercomputers.

At this writing, NASA has developed a controversial policy for supercomputer procurements. It is allowing vendors of Japanese equipment to bid on production-oriented systems, such as the Engineering Analysis and Data System (EADS II) at Marshall. However, it is precluding foreign participation for research-oriented systems, such as Ames' High-Speed Processor III initiative. INPUT expects administration trade policy, rather than procurement policy, to resolve this controversy.

C

Civilian Market

Currently, civilian spending on computer equipment dominates the federal market, although its growth rate trails that of the Defense Department. Civilian spending will grow from \$3.9 billion in 1991 to \$5.5 billion in 1996, a CAGR of 7% (see Exhibit III-5).

EXHIBIT III-5

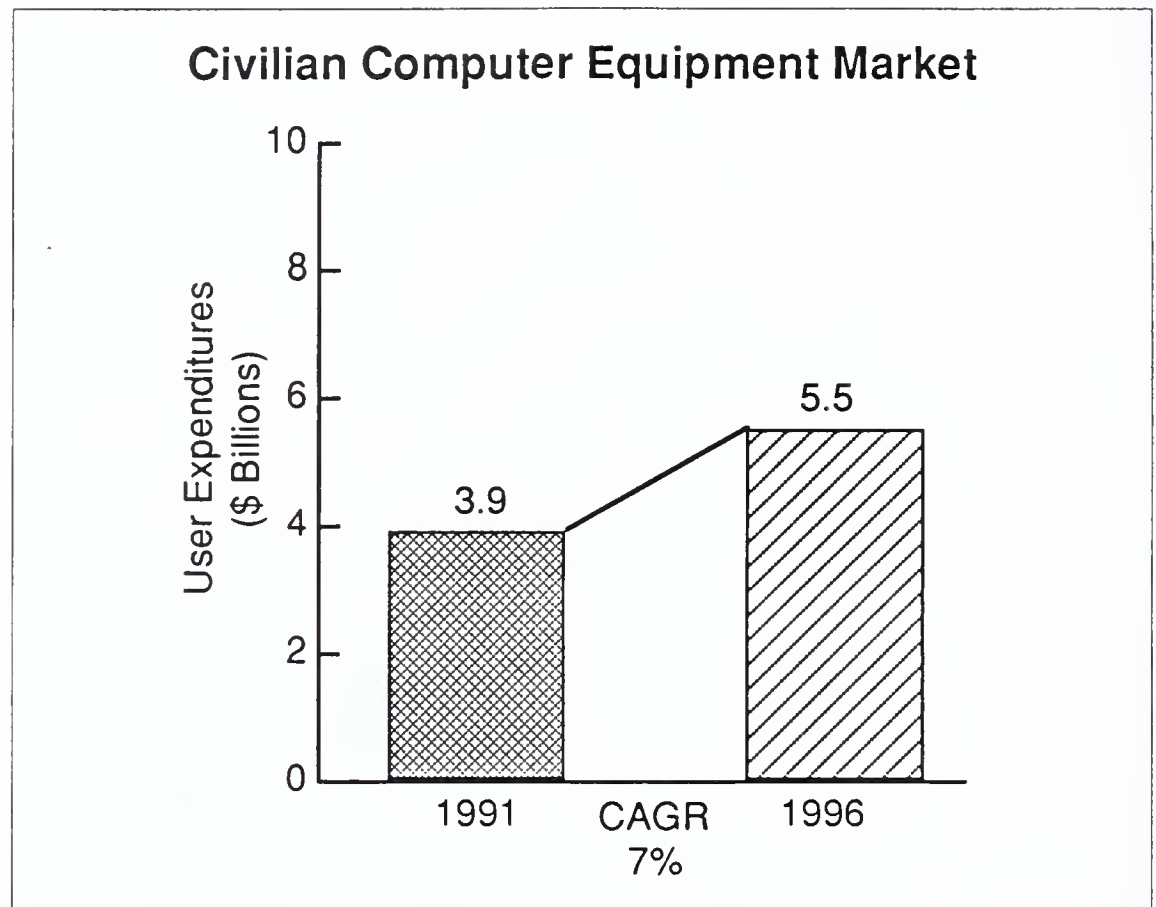
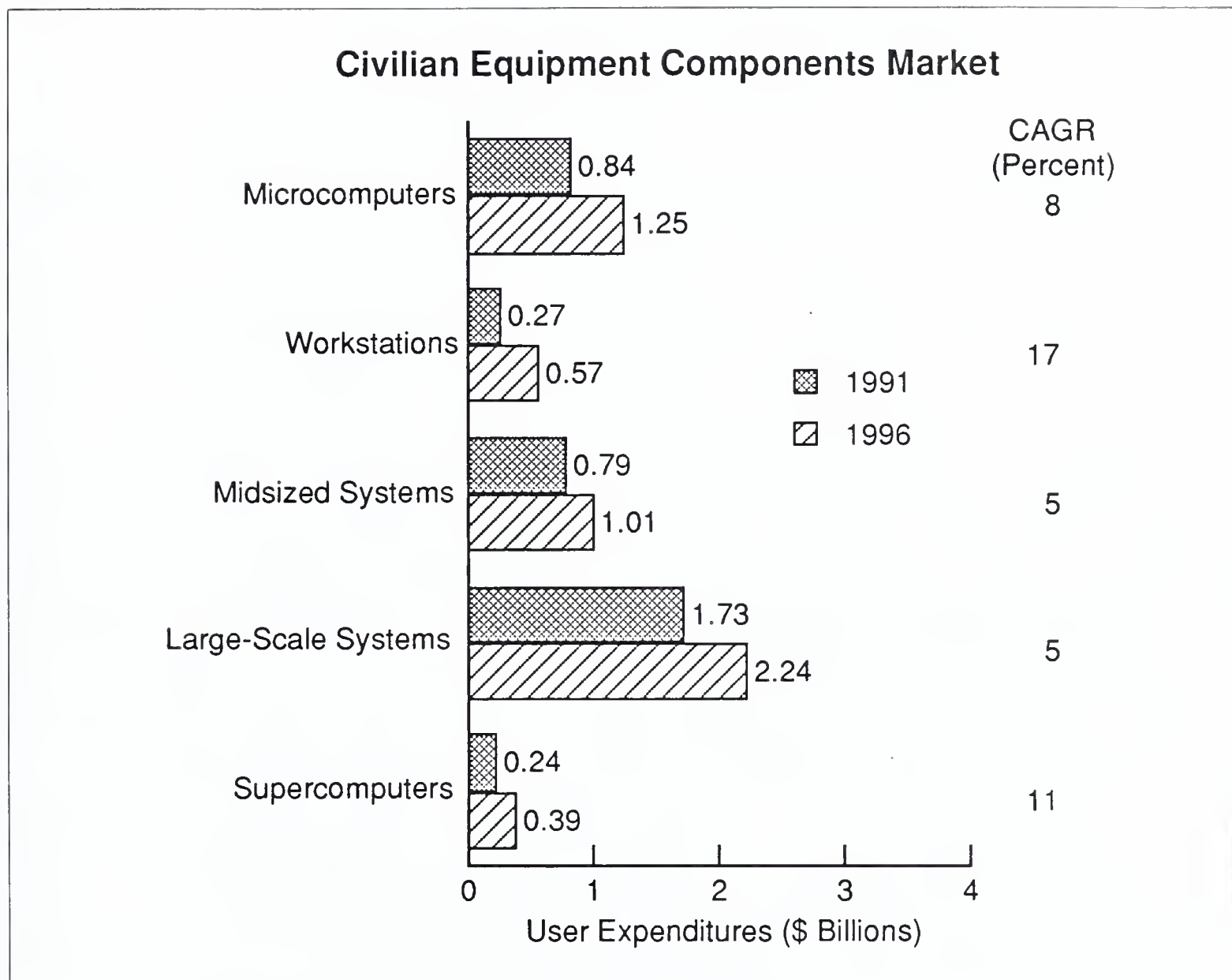


Exhibit III-6 shows market growth for the five categories listed in Section III.A. Again, large-scale computers take the largest share, while workstations account for the highest growth rate.

Exhibit III-7 contains excerpts from the spring 1991 budget submissions of several large civilian agencies. This data is included in Exhibit 43a, which agencies must submit to OMB in response to Circular A-11. Most of these agencies show significant growth in their equipment spending.

- Energy continues to show heavy spending plans for supercomputers. Further, one program—the Licensing Support System—may account for \$200 million in equipment spending.
- Unlike the other agencies in the exhibit, HHS shows no growth in equipment spending. However, it, too, has some interesting upcoming programs, including a turnkey imaging system, a child support and enforcement system, and an automated system to process port-of-entry documents.
- Like energy, NASA has announced several major supercomputer buys. It is also doing a mainframe requirements procurement which, if successful, may start a new trend. INPUT's PAR data base also includes four programs involving workstations.

EXHIBIT III-6



- With the spring 1991 budget submission, Transportation included, for the first time, airways improvement activities. This caused the 1990 actual expenditures to be nearly ten times the 1990 estimates. FAA's National Air Space initiatives account for the bulk of the equipment spending. However, FAA's Computer Resource Nucleus and FHA's Federal Lands Highway Engineering initiative account for sizable equipment spending.
- Treasury's equipment budget shows an increase of more than 50% between 1990 and 1992. In addition to the highly publicized Tax Systems Modernization (TSM) programs, Treasury also expects to acquire large volumes of equipment through the DMAC II and TMAC procurements. If TSM is delayed, IRS may need to upgrade or replace, on an interim basis, its Unisys 1100 series systems at the ten service centers.

EXHIBIT III-7

Civilian Agency Equipment Budgets

Agency		1990 Actual	1991 Estimate (\$ Millions)	1992 Forecast
Energy	Purchase	309	355	416
	Lease	93	120	146
	Total	402	475	562
HHS	Purchase	158	123	151
	Lease	22	25	21
	Total	180	148	172
NASA	Purchase	341	375	459
	Lease	94	85	92
	Total	435	460	551
Transportation	Purchase	394	569	594
	Lease	10	9	10
	Total	404	578	604
Treasury	Purchase	97	157	231
	Lease	99	79	84
	Total	196	236	315
Agriculture	Purchase	152	185	198
	Lease	21	16	15
	Total	173	201	213

- Although Agriculture's equipment budget is growing slowly, it, too, has announced some interesting programs. Through "Project 615", the Forest Service expects to replace equipment at 8,800 locations nationwide. With the Integrated Systems Acquisition Project, APHIS will acquire equipment and networks for up to 5,000 end users at more than 1,200 sites. Equipment vendors will need to establish a complex maintenance teaming structure in order to respond to these opportunities.

D**Defense Market**

Over the next five years, the Defense Department will spend considerably less than civilian agencies on computer equipment. This relates to the substantial reduction in defense activities associated with cessation of the Cold War and the Soviet threat. As shown in Exhibit III-8, Defense equipment spending will grow from \$2.1 billion in 1991 to \$3.3 billion in 1996, at a CAGR of 10%.

EXHIBIT III-8

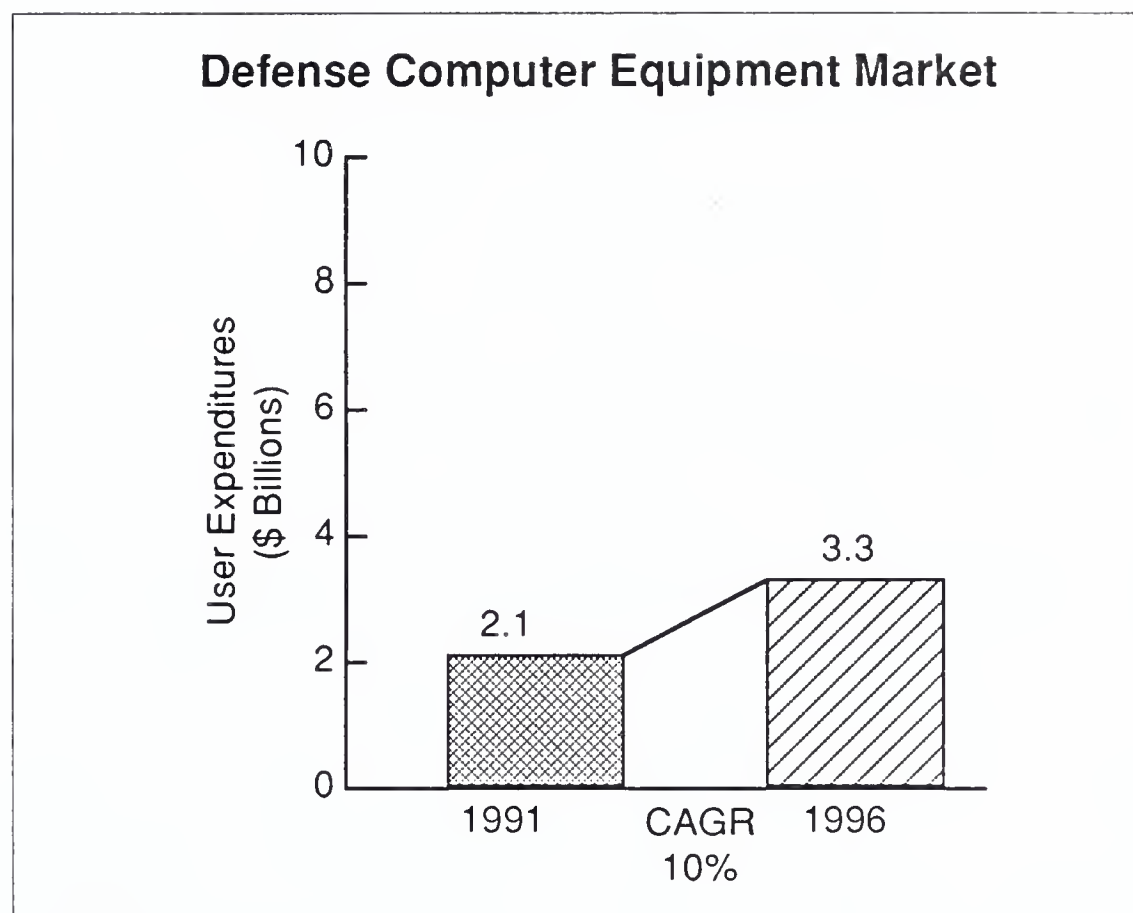


Exhibit III-9 shows market growth rates for the five equipment components. As was the case in the civilian agencies, large-scale systems account for the bulk of the spending, while workstations show the highest growth rate.

EXHIBIT III-9

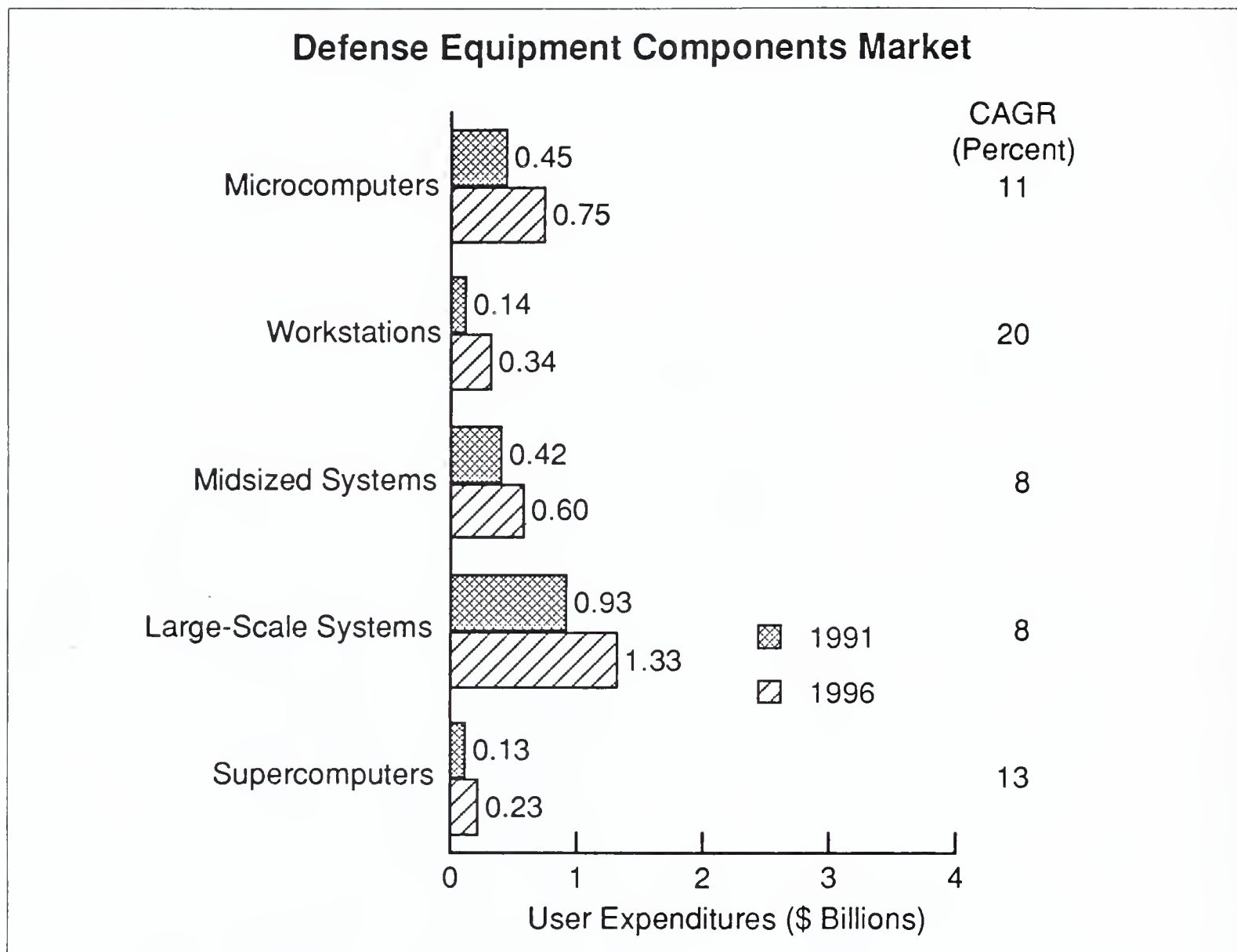


Exhibit III-10 contains equipment budget data from the major Defense Department agencies, as reported in the 43A exhibits. These agencies show a mixed picture of spending trends.

- Equipment spending in the Air Force declined nearly 50% from 1990 to 1991. This was due, in part, to the effects of DoD's Corporate Information Management Program. Some major programs, such as the Base Level Analysis and Reporting System (BLARS), were canceled. Others, such as Joint Uniform Services Technical Information System (JUSTIS), have been delayed and extended. Also, the Air Force has not acquired as much equipment as desired under Desktop III, since Unisys declined to raise production levels beyond the agreed-upon 6,000 units per month.

EXHIBIT III-10

Defense Agency Equipment Budgets

Agency		1990 Actual	1991 Estimate (\$ Millions)	1992 Forecast
Air Force	Purchase	376	196	317
	Lease	28	24	20
	Total	404	220	337
Army	Purchase	292	243	446
	Lease	30	35	32
	Total	322	278	478
Navy	Purchase	336	315	379
	Lease	39	41	39
	Total	375	356	418
OSD*	Purchase	157	267	320
	Lease	6	6	6
	Total	163	273	326

*Includes other major Defense agencies, such as DLA and DCA.

- The Army, on the other hand, is showing a 50% increase in equipment spending between 1990 and 1992. Through award of Army CALS Phase III and RCAS Phase II, the Army expects to acquire large volumes of equipment in 1992. Other recently awarded contracts, such as the Personnel Electronic Records Management System and the Lightweight Computer Unit, should account for increased equipment spending. Finally, there are numerous additional open opportunities that will be awarded in 1992.
- Navy equipment spending is remaining fairly flat over the three-year period. However, it, too, has some interesting projects, like the Navy's superminicomputer, tactical advanced computer, and Inventory Control Points II. Digital's recent capture of the Navy's PC/LAN contract will also account for some 1992 spending.
- OSD's spending, which includes such major agencies as DCA and DLA, shows a doubling between 1990 and 1992. DIA's RISC technology workstation project and Joint Worldwide Intelligence Communications System will account for some of the spending. The mainframe replacement at Defense Finance and Accounting Service will also lead

to some equipment spending. However, INPUT believes some of this budgetary growth comes from the transfer of funding from the individual services into CIM projects. Although funding is supposed to be returned to the agencies, it is by no means clear this is happening.

E

Leading Vendors

Exhibit III-11 lists the leading vendor, by inventory value, in each of the five categories defined in Section III.A. Chapter V presents a detailed discussion of the leading vendors in the federal market.

EXHIBIT III-11

Leading Federal Equipment Vendors

Component	Vendor
Microcomputers	Zenith
Workstations	Sun
Midsized	Digital
Large-Scale	IBM
Supercomputers	Cray

INPUT expects the microcomputer distribution pattern to shift sharply over the next few years. Three current DoD contracts will precipitate these changes:

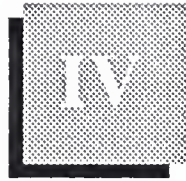
- Air Force DESKTOP III
- Army SMC
- Navy COMPANION

In addition, at this writing Sysorex has won Treasury's DMAC II contract, with Sears protesting. This represents a reversal from 1990, when Sears won and Sysorex (among others) protested. As pointed out in Section III.D, low price is driving the federal (and, to a large extent, commercial) microcomputer market.

INPUT does not expect such drastic changes in the other market segments, at least for the next two years.

- While various firms, including Hewlett-Packard, Digital, and IBM will make significant inroads into Sun's market share, the latter's market dominance is too large to be overcome.
- Similarly, Digital overwhelmingly dominates the federal midsized market. INPUT sees no reason for that to change, although IBM's AS/400 line is gaining in popularity.

- IBM will continue to dominate the mainframe market. Despite Congressional attempts to limit IBM-oriented specifications, many agencies will continue buying IBM equipment. If anything, the large volume of equipment deliveries to the FAA, in support of Air Traffic Control modernization, will increase IBM's dominance.
- Finally, INPUT expects Cray to continue dominance of the federal supercomputer market. At this writing, GSA has opened some supercomputer bids to Japanese firms. If bilateral trade negotiations continue to progress, INPUT expects virtually all supercomputer buys to be opened to Japanese firms. However, Cray will continue to capture the bulk of federal supercomputer business.



Federal User Requirements and Trends

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A

Installation Profile

1. Agency Respondents' Current Installed Base

For the purpose of this study, INPUT divides computer equipment into five categories according to system size. The categories and their definitions appear in Exhibit IV-1. Computer equipment and systems include processors and peripherals.

Agency respondents were asked to identify the types of computer equipment currently used by their organizations. Exhibit IV-2 presents INPUT's survey results for agency use by system size. As might be expected, the data indicate that the most widely installed computer systems are microcomputers. The prevalence of computer equipment within government organizations corresponds to system size: the smaller the system, the higher the installation base within the respondent agencies.

Agency responses also show an incremental relationship among system sizes:

- Eighty-three percent of the agencies reporting supercomputer inventory also report mainframe, midsize, workstation, and microcomputer inventory.
- Seventy-six percent of the agencies reporting mainframe inventory also report midsize, workstation, and microcomputer inventory.
- Eighty-eight percent of the respondents reporting midsize computer inventory also report workstation and microcomputer inventory.
- One hundred percent of the respondent agencies possessing workstations also possess microcomputers. Virtually all federal agencies now use microcomputers.

EXHIBIT IV-1

Categories of Computer Equipment

- **Microcomputers**
 - Primarily single-user computers
 - Priced less than \$15,000
 - All CPU, memory, and peripheral functions of an 8-, 16-, or 32-bit computer combined on a chip
 - May include an integrated circuit package, plug-in boards, or consoles
- **Workstations**
 - High-performance, desktop, single-user computers
 - Predominantly employ Reduced Instruction Set Computing (RISC)
 - Possess integrated high-speed local network-based services such as data base access, file storage and back-up, remote communications, and peripheral support
- **Midsized Computers**
 - Typically 32- or 64-bit computers
 - Run extensive applications software
 - Control a number of peripherals
 - May have standalone or multiple-CPU configurations
 - Specific systems in this category are IBM 93XX and AS/400 systems and Digital VAX series systems, excluding the largest models
 - Include most shared-logic, integrated office systems

EXHIBIT IV-1 (CON'T)

Categories of Computer Equipment

- Mainframes
 - Multiple-user systems
 - May consist of multiple processors or parallel processors
 - Typically 8 to 32 million bytes of main memory
 - Typically used with general-purpose, VonNeumann-type processors for system control
 - Usually refers to traditional mainframes such as IBM 30XX, Unisys 1100/XX, Honeywell DDPS88, Unisys A15, or CDC Cyber series
 - Does not include supercomputers
- Supercomputers
 - High-speed, high-powered processors with numerical processing
 - Fall into two categories: real-time systems generally used for signal processing in military applications, and non-real-time systems for scientific use

EXHIBIT IV-2

Respondent Agency Usage by System Type

Type	Percent Reporting
Microcomputers	100
Workstations	77
Midsized Computers	69
Mainframes	65
Supercomputers	27

Sample Size: 26

Downsizing may be one possible explanation for the existence of a wide variety of computer systems within organizations. New technology permits some computer applications to be moved to smaller systems while other applications remain on larger systems. This may also suggest that within an organization a wide variety of computer systems is needed to perform different tasks and applications. Different classes of computers perform different tasks. Downsizing will be discussed further in the applications environment segment of this section.

Agency usage by system type is shown in Exhibit IV-3. INPUT obtained this government agency computer inventory data from Computer Intelligence, Inc. (CI).

EXHIBIT IV-3

Agency Usage by System Type

Type	Percent Reporting
Microcomputers	100
Workstations	94
Midsized Computers	100
Mainframes	100
Supercomputers	50

Source: *Computer Intelligence*—March 1991.

The inventory data from CI more thoroughly defines the systems in use within the federal government's departments and top agencies. The CI data verifies the trend that the smaller the computer system, the larger the presence within the government. The CI data also shows an incremental relationship among system sizes, which supports INPUT's survey finding that agencies owning larger computer systems also own smaller systems. All of the departments and agencies reporting supercomputer inventory also report mainframe inventory, midsized computer inventory, workstation inventory, and microcomputer inventory. This trend holds true for agencies with mainframes, midsized computers, and microcomputers.

The CI data suggests a higher penetration by supercomputers than previously reported. However, since this data is taken at the departmental or major independent agency level, it does not imply 50% penetration of each agency throughout the government. It does show, however, that

supercomputers are installed at more than merely the military and scientific agencies. CI data indicates that 96 supercomputers are installed in civilian agencies and 81 supercomputers are installed in defense agencies.

INPUT obtained inventory counts and values for workstations, midsize computers, mainframes, and supercomputers from CI's federal computer inventory data base. According to the data base, 9,000 workstations, 11,700 midsize computers, 1,600 mainframes, and 175 supercomputers are currently installed throughout the federal government.

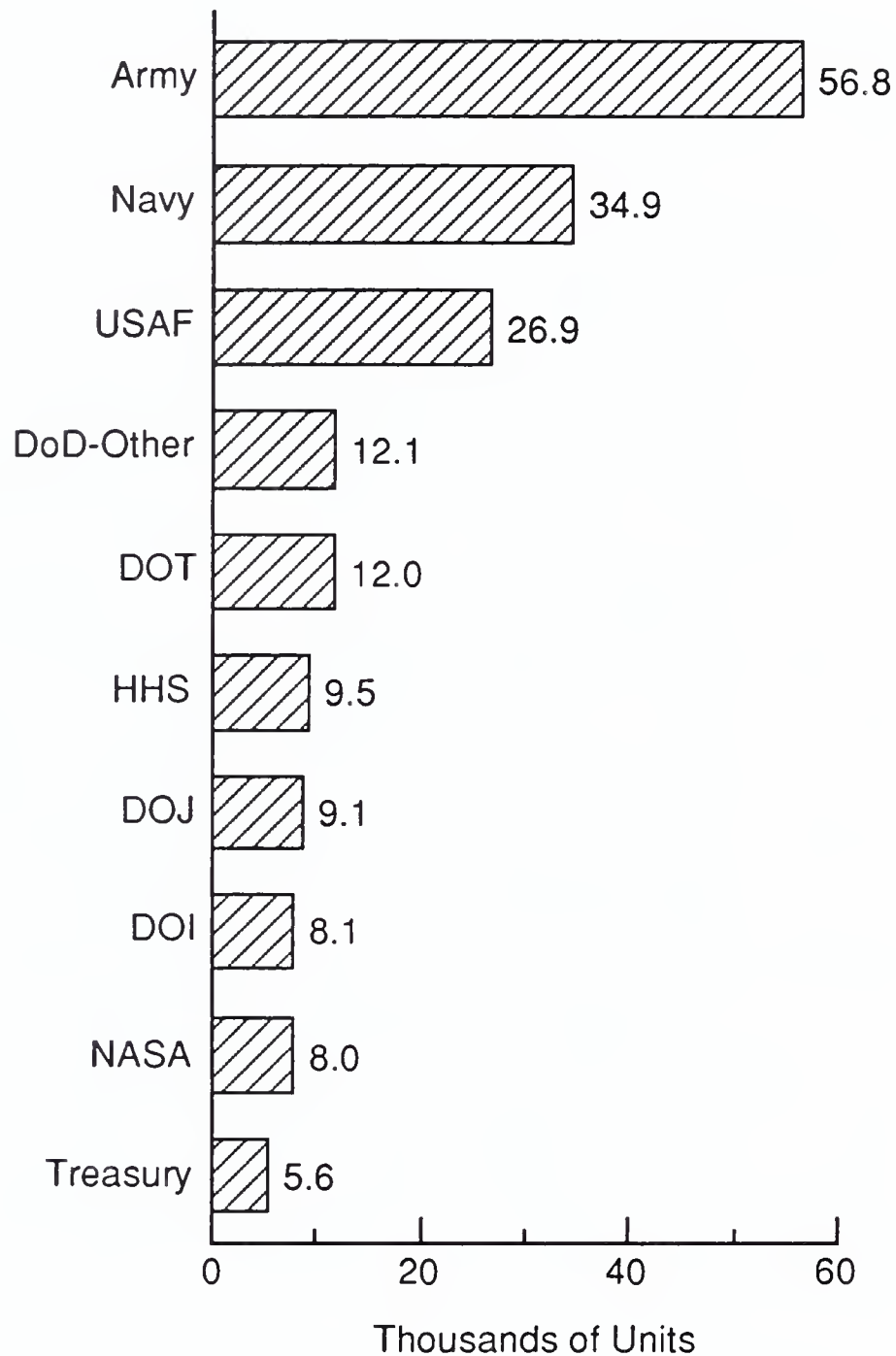
CI's definition of microcomputers does not correspond with INPUT's definition. CI defines a microcomputer as a freestanding CPU with a single-user operating system. This definition does not include desktop or personal computers connected to a larger system through a network. Therefore, the CI microcomputer inventory numbers are inappropriate for this report. CI data is partial (since some agency sites are not contacted), but still valuable in determining market concentration.

In September 1990, GSA's Information Resource Management Service (IRMS) released its *Microcomputer Survey Report*. GSA defines a microcomputer as a desktop-based workstation with at least one central processing unit, a single-user operating system, and standalone operational capability. This definition includes standalone and networked microprocessors. The survey indicates the total inventory of microcomputers in the federal government, reported by agencies as of September 30, 1989. GSA reported approximately 1,002,000 microcomputers in use within the government, representing an increase of more than 512,000 units since the previous survey in FY 1987.

According to GSA's *Microcomputer Survey Report*, approximately 223,000 microcomputers were purchased in FY 1989. Eighty-two percent of these purchases were made by the 10 largest agencies, including 130,750 by Department of Defense agencies. The Department of Transportation was the largest microcomputer purchaser among civilian agencies, with 11,956 purchases in FY 1989. Exhibit IV-4 shows the 10 largest agencies' FY 1989 microcomputer acquisitions.

EXHIBIT IV-4

Fiscal Year 1989—Microcomputer Acquisitions by Agency



Source: *Microcomputer Survey Report*, Information Resource Management Service, U.S. General Services Administration: September 1990.

In December 1990, the U.S. General Accounting Office's (GAO) Information Management and Technology Division published a report entitled, *Mainframe Procurements, Statistics Showing How and What the Government Is Acquiring*. GAO reported that federal agencies obligated \$1.9 billion for mainframe and mainframe peripheral procurements

during the 3.5 fiscal years ending in March 1989. During this timeframe, the number of mainframe and peripheral procurements totaled 3,225. The dollar figure is somewhat lower than earlier INPUT estimates. Differences may arise from the following factors:

- Previously, INPUT combined mainframe and supercomputer procurements into the same category.
- GAO's survey included only 35 agencies out of 92, although most of the major agencies were represented.
- GAO did not independently evaluate the data supplied by the agencies.

The number of microcomputers, workstations, midsize computers, mainframes, and supercomputers reported by the top 16 federal agencies appears in Exhibits IV-5 through IV-9.

The Army, Air Force, and Navy account for 60% of government microcomputer installations, as shown in Exhibit IV-5. Reasons for this large inventory may include the military build-up of the 1980s and the Air Force's Desktop II contract. During the Cold War and the Reagan years, automation of defense systems was the key to becoming the world's dominant military nation. Because of this focus on defense, the military began to automate before other government agencies. It may be assumed that military microcomputer systems are older than microcomputer systems present in other agencies, and that the military possesses a larger accumulated microcomputer inventory. Unisys' Desktop III contract, EDS' SMC contract, and GTSI's COMPANION contract are helping to fill the Defense Department's need to replace old systems.

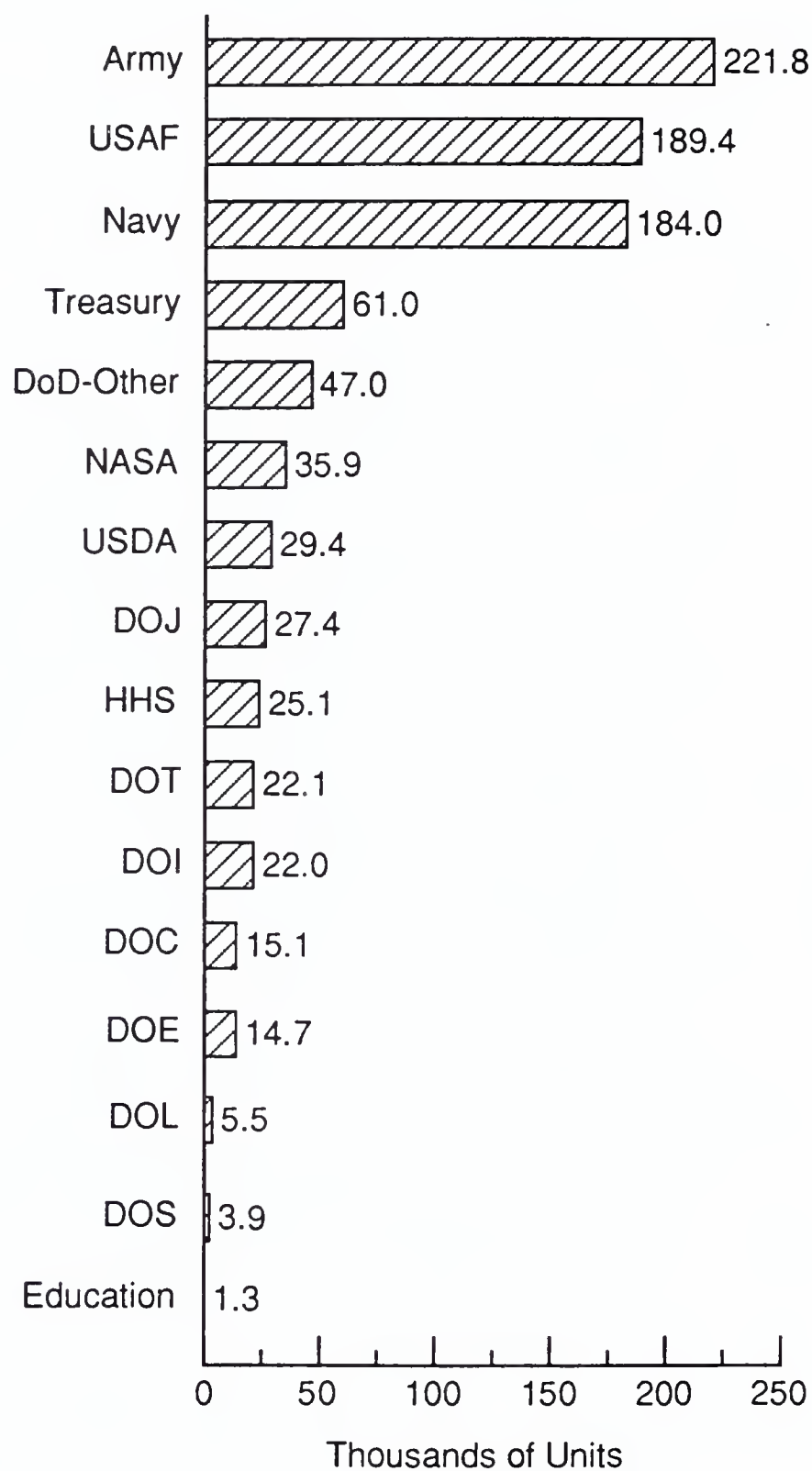
Microcomputers are the computers of choice within military agencies because they are lightweight, small in size, mobile, and low cost.

The end of the Cold War suggests less need for military buildup. But the unforeseen war with Iraq enforced the philosophy that the U.S. needs to remain prepared for such unpredictable events. Also, the technological superiority shown by the U.S. during this conflict must be maintained in case of further unavoidable conflicts. These factors will tend to mitigate the effects of budget cuts.

In order to maintain military technological dominance, the Army, Air Force, and Navy will need to update their current microcomputer systems. Hardware vendors and systems integrators may look forward to increased microcomputer acquisitions from military agencies, as well as a greater need for software, maintenance, service, communications equipment, and system engineering and design. Also, the planned reductions in military personnel will cause an increased need for automation of functions previously performed by individuals.

EXHIBIT IV-5

Microcomputer Inventory by Agency



Source: *Microcomputer Survey Report*, Information Resource Management Service, U.S. General Services Administration: September 1990.

The Army's Lightweight Computer Unit (LCU) procurement illustrates the need for new microcomputers in military applications. The Army plans to buy 20,000 ruggedized laptops through the LCU procurement, which is potentially worth \$500 million. The procurement is being protested before award, however, on the alleged basis of lack of evaluation criteria in the request for proposal.

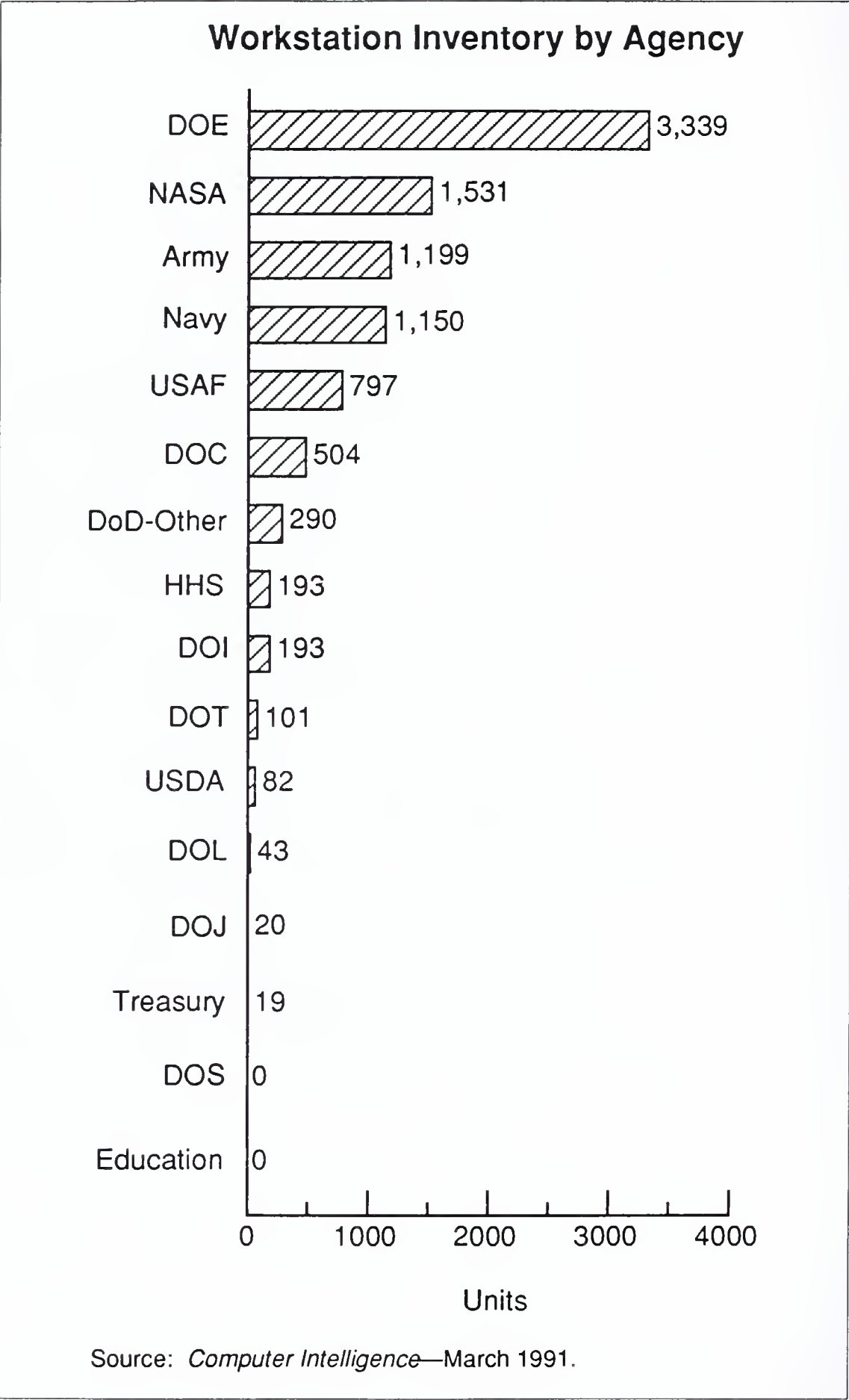
Exhibit IV-6 presents the amount of workstation inventory available within the top federal agencies. The Department of Energy (DOE) has the highest workstation inventory of all government agencies. Nuclear weapons development and nuclear energy regulation are two reasons for such great computing capacity. DOE has been characterized in the press as a "powerhouse of computing" that regulates electric utilities, oil pipelines, hydroelectric projects, the gas industry, nuclear weapon development, and nuclear energy. Claims a DOE scientist, "Big science requires big computing," which is in the form of workstations and supercomputers. DOE spends the largest amount of its information technology budget on defense programs.

Hardware vendors and systems integrators may find DOE to be a good target for additional workstation sales. Workstations are the most applicable computer system for use in modeling energy regulation, environmental protection, energy conservation, and new energy development.

NASA, Army, and Navy have the next highest workstation inventories. NASA may be a good target for workstation sales because of the increased focus on space and NASA's increased information technology budget for FY 1992. The Army and Navy are also good workstation targets because of military personnel reductions and the need to automate the functions they perform.

In the 1990s, many government workers expect to use general-purpose workstations, such as electronic desktops, to do office work that now requires paper. Workstations can be used for electronic mail, preparation of documents, calendar maintenance, and information filing.

EXHIBIT IV-6



The Department of Agriculture (USDA) has the greatest number of government midsize computer installations, as shown in Exhibit IV-7. The USDA ranks seventh for microcomputer inventory, eleventh for workstation inventory, and twelfth for mainframe inventory. The size of the inventory suggests that many of the USDA's microcomputers and workstations are networked to midsize computers. The USDA does not require very large, high-speed computing systems to accomplish its mission. This agency is probably a poor target for mainframes or super computers, but may be an excellent target for microcomputers.

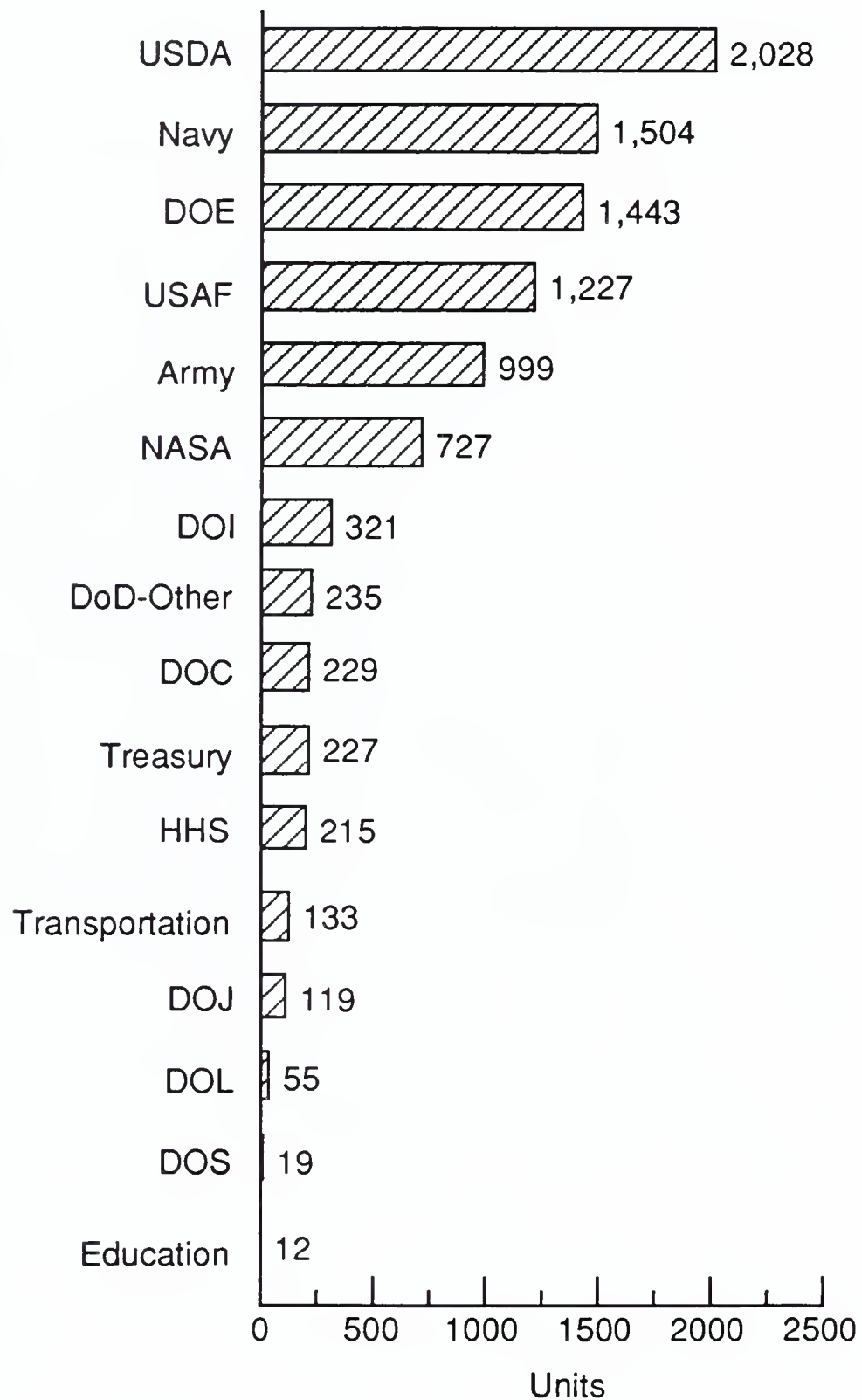
The Navy and DOE also possess a significant number of midsize computers. The Navy's midsize computers are housed mostly on land because of their size and weight. The trend is toward microcomputers on board ships and carriers. Since the Navy has been building up computer equipment longer than most other agencies, it may be a good target for new mid-size computer equipment.

In addition to its workstation inventory, DOE owns a large number of midsize computers. DOE's need for a high volume of computing capacity will continue to grow as it regulates current forms of energy and develops new energy sources.

Agencies with smaller inventories of midsize systems may also be targets for additional midsize systems. In December 1990, the Veterans Affairs Department awarded its largest ADP contract, Nationwide Office Automation for the VA (NOAVA), to Lockheed Integrated Solutions Co. Through the contract, the VA will acquire several DEC midrange computers running Ultrix. The contract could be worth up to \$153 million, although at this writing, the award is under protest by Unisys.

EXHIBIT IV-7

Midsized Computer Inventory by Agency



Source: *Computer Intelligence*—March 1991.

As shown in Exhibit IV-8, the Air Force greatly exceeds other agencies in mainframe inventory, with 23% of total federal mainframe installations. The Air Force, Army, and Navy combined hold 50% of all federal mainframe installations. The large number of mainframes, along with the large number of microcomputers present in the U.S. military, leads INPUT to believe these systems resulted from the Cold War buildup and the military goals of the Reagan Administration.

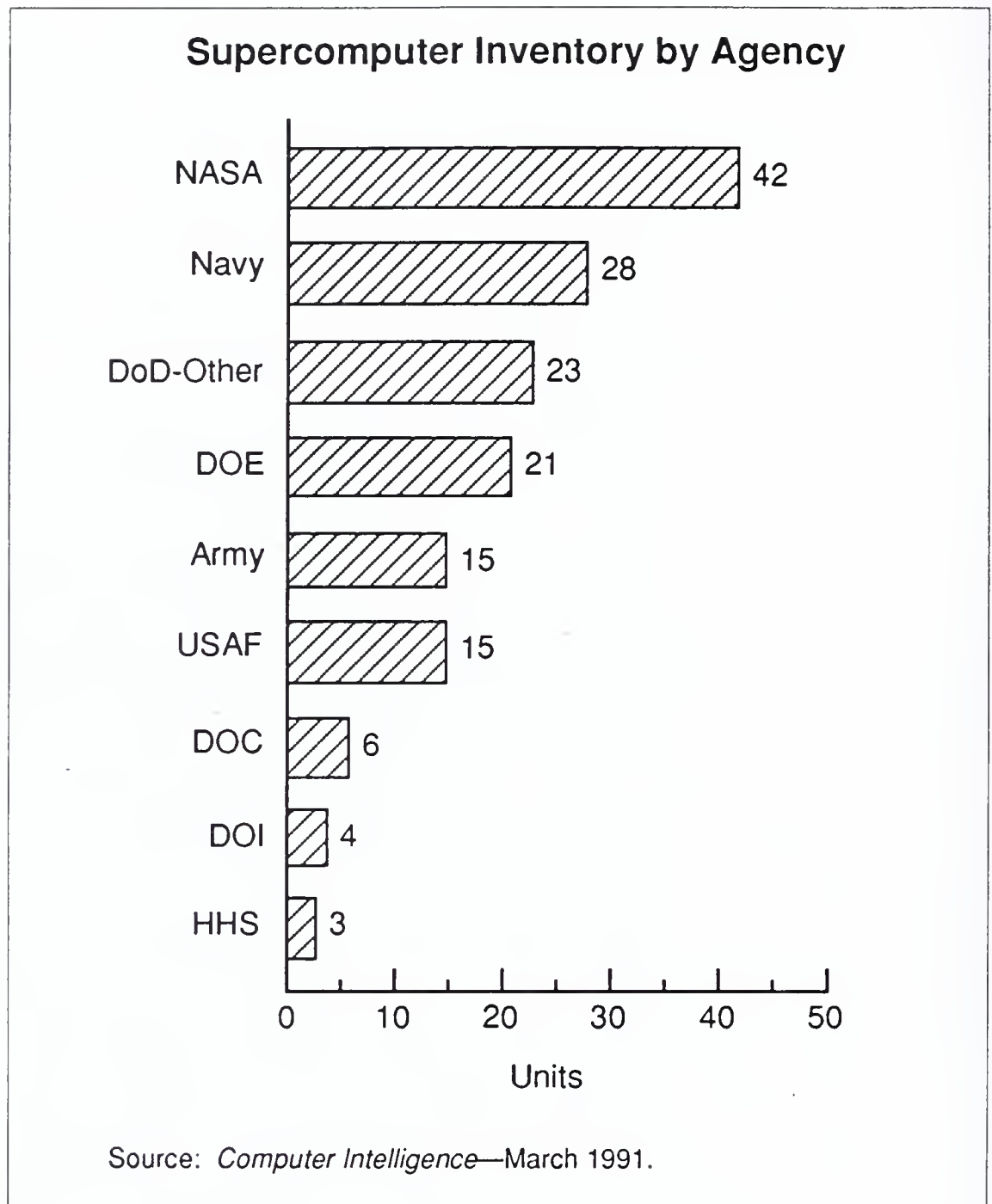
Maintaining this high-tech military ability will be important in the 1990s. To accomplish this goal, military systems will need to be kept technologically up-to-date. This could require procurements to replace older computer equipment, gain new software, buy networking capability, maintain existing systems, or upgrade existing systems.

The average age of DoD mainframe systems is about 11 years. The Defense Nuclear Agency owns the oldest systems, which are an average of 12.2 years old. The Navy and Army possess the next oldest mainframes, which are an average of 10.5 years of age. Because of technological advances in the past decade, defense agencies will need to upgrade or replace existing old, outdated systems to maintain military dominance.

In May 1991, NASA plans to award a \$460 million contract for 48 mainframe systems to support its space station and space shuttle operations. The Operations Automatic Data Processing (OADP) contract is intended to cut down on the procurement cycle for building a common computer architecture for Johnson Space Flight Center and other NASA centers. This award could result in a de facto standard throughout NASA.

The GAO's December 1990 report, *Mainframe Procurements*, calculates that the number of mainframe and mainframe peripheral procurements over the prior 3.5 years is 3,225. This number is significantly larger than CI's calculation of 1,626 federal mainframe installations. The GAO's report does not distinguish between mainframe and mainframe peripheral procurements, which causes a great discrepancy between the two reports. CI's data in units of mainframes is more useful to INPUT for purposes of this report.

EXHIBIT IV-9



the ADPE/DS data base for equipment totals as of March 31, 1990 was published in a report entitled *Automatic Data Processing Equipment in the U.S. Government, First and Second Quarter FY 1990 Summary*. Exhibit IV-10 shows the average age for all computer equipment as stated in the above report. Agencies with the oldest hardware may be targets for hardware vendors, systems integrators, and companies offering outsourcing.

EXHIBIT IV-10

Computer Equipment Average Age by Agency

Agency	Average Age (Yr/Mo)
Treasury	16/03
Labor	16/01
Commerce	14/09
Air Force	14/04
Energy	14/00
Navy	13/10
Agriculture	13/04
NASA	13/02
Housing and Urban Dev.	13/00
Army	12/06
Transportation	11/00
General Services Admin.	10/05
Health and Human Services	9/11
Veterans Administration	9/04
Interior	8/10
State	8/07
Justice	8/06
Education	8/02

The ADPE report does not include microcomputer inventory and only partial workstation inventory. It categorizes systems by the following dollar values:

- Midsized Computers: \$50,000 - \$500,000
- Mainframes: \$500,000 - \$4,000,000
- Supercomputers: Over \$4,000,000

The Treasury Department owns the oldest computers in the federal government. It has a large number of midsized systems, but the average age of these systems is 17 years. Treasury also owns a substantial number of mainframes, and the largest number of microcomputers among civilian agencies. It appears Treasury may be attempting to replace its old minicomputer systems by downsizing some applications to micros and upgrading others to mainframes. Hardware vendors and systems integrators may find a large market for additional microcomputers, mainframes, and networking solutions within the Treasury Department due to the age of the midsized systems in use today.

The Labor Department also has some of the oldest computers. The midrange computer inventory is the oldest and largest of the five equipment categories; computers are an average age of 16 years. The Labor Department ranks low in micros, workstations, mainframes, and supercomputers. The Labor Department may be able to justify purchasing new microcomputers, to downsize some applications, because they are cheaper and can be networked to the already-installed midsized systems. Labor may also want to upgrade a few midsized systems to mainframes, thereby increasing computing power.

Most of the Air Force's computer inventory is also outdated. The Air Force ranks second in microcomputer inventory and first in mainframe inventory. The midsized systems are the oldest, with an average age of 14.5 years. According to GAO's report, most of the Air Force's mainframe systems were purchased within the last 3.5 years and are technologically up-to-date. The Air Force is a good target market for new midsized computers or additional micros for downsizing applications.

The Navy's mainframes have an average age of 17 years, while midsized computers and supercomputers have an average age of 10 years. Hardware vendors may watch for increased mainframe acquisitions and service contracts for the old systems.

The average age of midsized computers in the Energy Department is 16 years. DOE's mainframes and supercomputers are relatively new systems. Contractors wishing to sell to DOE should explore acquisitions of midsized computers and networking opportunities.

In general, the government's midsize computer systems are the oldest. One explanation for this may be that these were the largest and most powerful systems when they were purchased, but as technology advanced, some systems became larger and more powerful, while microcomputers and workstations also came into existence. Today there is a wider variety of system sizes to fit different agency applications environments.

B

Processing Role: Standalone versus Interconnected

Agency respondents were asked to identify the percentage of computer equipment that operates as a standalone system, on a local-area network (LAN), and on a wide-area network (WAN). A LAN connects computing resources in a relatively small area, whereas a WAN can connect computing resources over a large geographical area. Exhibit IV-11 shows the percentage of respondent agencies possessing each type of connection.

EXHIBIT IV-11

Standalone vs. Interconnected Processing within Agencies

Type of Connection	Percentage of Respondents
Standalone Only	6
Distributed Only	18
LANs	94
WANs	29

Of the agencies responding, 82% employ some type of standalone system. Of those agencies reporting some standalone processing:

- The average amount of computer equipment devoted to standalone processing is 28%.
- Of agencies reporting LAN use, an average of 71% of all computer equipment operates on a network.
- Of those reporting WAN use, an average of 45% of all computer equipment operates on a WAN.

Judging from the number of agencies using LAN technology, communications among computer systems appears essential. The mix between standalone computers and distributed systems is important (82% vs. 94%). Current WAN use is low. There may be growth potential for WAN products within the federal sector.

A survey by CI indicates the federal government is the leading user of LAN technology. More than 50% of all government agencies have LANs installed. The report is based on a survey of over 2,000 users in federal government, Fortune 1,000 companies, and other enterprises. The report also shows that only 34% of non-government users have LANs. The popularity of LANs comes from the fact that government sites are usually large and consist of many work groups. Ethernet is more widespread than Token-Ring networks.

INPUT believes the federal government, as a whole, will provide ample opportunity for contractors providing LAN services, support, operation, training, hardware, software, and data communications equipment.

C

Applications Environment

1. Current Applications Area

Agency respondents were asked to identify the applications that run on their currently installed computer systems. Exhibit IV-12 lists the most popular applications in use according to system size.

Word processing, electronic publishing, and project management dominate the applications run on microcomputers. For example, revenue agents within the IRS's examinations division make extensive use of laptop computers for word processing, spreadsheets, and data base functions. The Housing and Urban Development Department also use laptops and portable microcomputers to generate reports, word processing documents, spreadsheets, and data bases.

Major workstation applications include scientific and engineering use, electronic publishing, and communication. INPUT believes workstations may become as common as the telephone for sharing information.

Government workers are expected to use workstations for word processing, electronic communication, information retrieval and storage, and calculation. Software applications products vendors will need to work with workstation vendors to ensure users can access products from various vendors, using the same user interface, and communicate and exchange data among them.

EXHIBIT IV-12

Applications by Equipment Size

Application Type	Percent of Respondents Mentioning by System Size				
	Micro-computer	Work-station	Mid-sized	Main-frame	Super-computer
Information Analysis	71	50	56	81	17
Human Resources	74	31	46	75	0
Electronic Mail	75	61	69	56	17
Electronic Publishing	89	67	33	46	0
Logistics and Distribution	74	40	39	93	0
Scientific/Engineering	77	86	75	83	80
Communications	61	65	73	93	50
Word Processing	92	72	38	38	17
Administrative	74	35	67	80	0
Finance/Accounting	71	33	64	85	0
Project Management	87	53	40	40	0

According to the agencies polled by INPUT, midsize computer systems are primarily used for scientific and engineering functions, communications, and electronic mail. When considering procuring such systems, government agencies are expected to make their decisions based on the system's intended applications.

In a small government agency or department where the midrange computer's intended use involves different general-purpose applications, ease of administration and software availability are the main considerations in purchasing decisions. In this instance, upgradability is another plus.

Agencies using the minicomputer as a general departmental processor need sophisticated communications capabilities to share data and support services with headquarters and other departmental minicomputers. The big issues for this group of buyers are communications and compatibility.

For the minicomputer buyer who needs a specialized processor, the application is the important factor. The systems will be selected to optimize performance of the specialized application.

Departments or agencies involved in moving applications from a mainframe to a minicomputer in a LAN or WAN configuration may want to buy more than one machine. Communications, high-performance processing, and intensive input/output capabilities will be important variables in this type of purchase.

The fifth group of user/purchaser uses midsize computers as specialized LAN servers. Functions important to this group include large-capacity storage, multiple access paths, high-speed throughput, and various ports.

The Veterans Affairs Department is acquiring several DEC midrange computers under its Nationwide Office Automation for the VA (NOAVA) contract. The contract will update, connect, and consolidate office systems throughout the agency. This contract is a VA effort to apply the Government Open Systems Interconnection Profile (GOSIP) and POSIX standards.

Agency respondents to INPUT's survey indicate that mainframe applications are used heavily for logistics, distribution, and communication. Other high-ranking applications include finance/accounting, scientific/engineering, and information analysis.

NASA's Operations Automatic Data Processing (OADP) procurement, with planned award in May 1991, will allow for the purchase of approximately 48 mainframe systems to support space station and space shuttle operations. These support functions will involve logistics applications, as well as scientific and engineering applications.

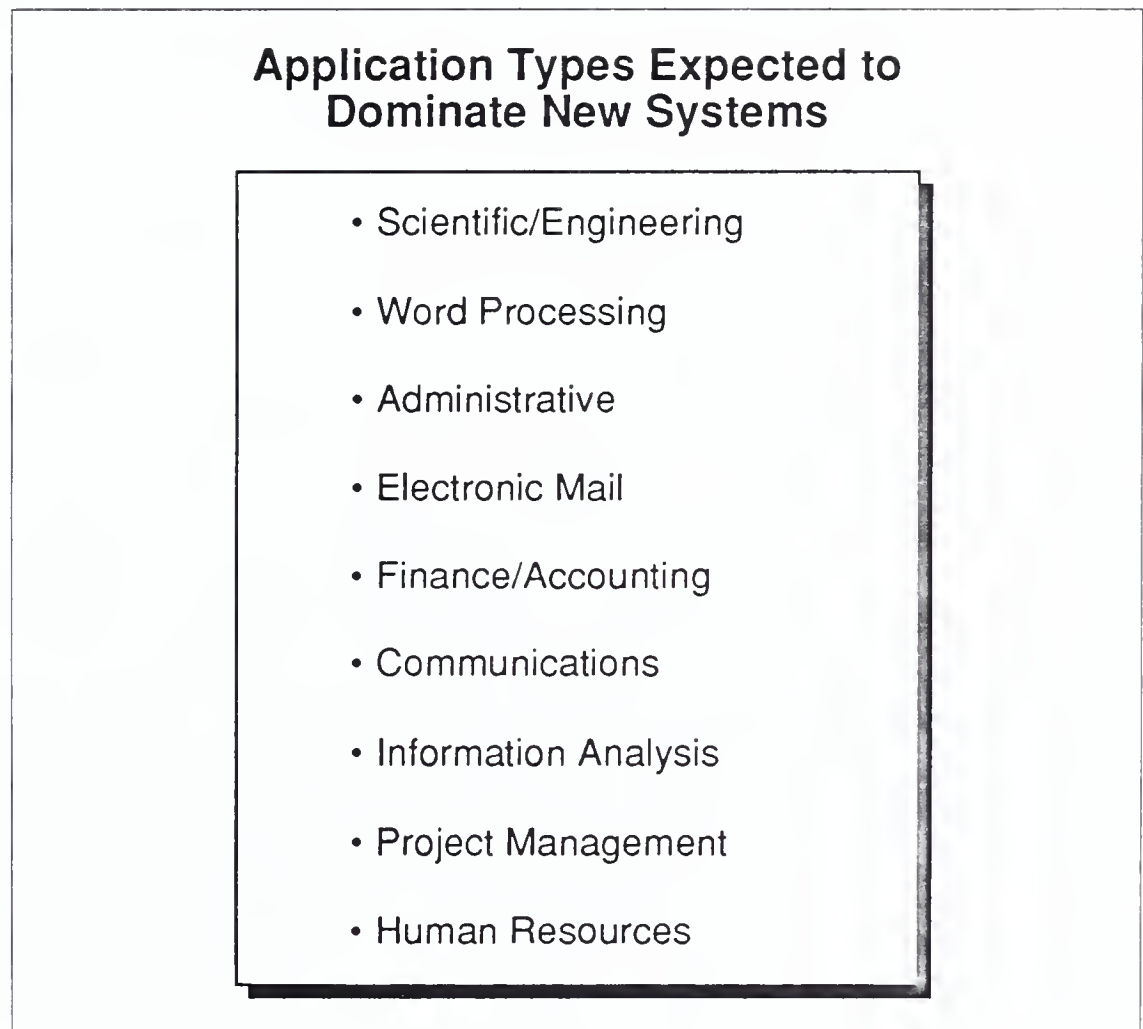
Supercomputers are most widely used for scientific and engineering applications, according to agency respondents. An example of a supercomputer procurement for scientific use is evident in the National Cancer Institute's solicitation for a supercomputer system to be used by biomedical researchers for molecular modeling and genetic sequence analysis. This contract was awarded to Lockheed Integrated Solutions in February 1991, but has been canceled because of protests.

In the past, supercomputer procurements were bid by large integrators, but they are becoming more of a commodity as smaller integrators enter the market and introduce price competition.

2. Future Applications Areas

Agency respondents were asked to list applications they expect to dominate new systems within their organizations in the future. Exhibit IV-13 lists these applications in order of frequency of mention by respondent agencies.

EXHIBIT IV-13



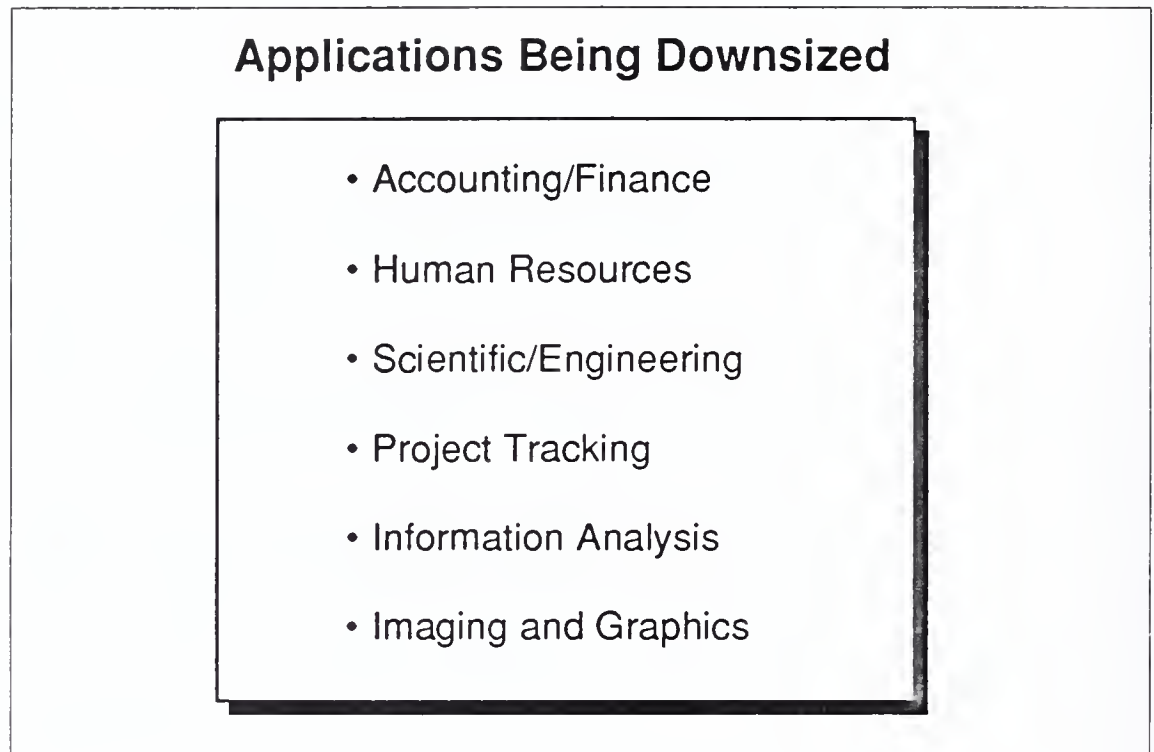
Scientific/engineering applications ranked highest as a possible application to be supported by additional computer equipment. These applications are typically run on larger systems such as midsize computers, mainframes, and supercomputers. Agency responses could indicate a planned increase in larger systems procurements from the federal government.

Agency respondents believe word processing and administrative functions are also likely applications to require additional computer equipment. These applications are typically performed by smaller systems such as microcomputers and workstations. These responses may indicate that there will be a need for smaller computer systems in the future.

3. Downsizing of Applications

Fifty-two percent of respondent agencies are in the process of downsizing or have already downsized applications to smaller computer systems. According to agencies surveyed, the most popularly downsized application is accounting/finance. Exhibit IV-14 lists applications identified by respondents as being downsized.

EXHIBIT IV-14



Respondent agencies are downsizing to the following systems:

- Twenty-eight percent of the respondents are downsizing to microcomputer systems.
- Eight percent are downsizing to workstations, and 16% are downsizing to both.
- Forty-eight percent of the respondents are not downsizing.

Of the respondents who are downsizing, many are moving accounting and finance applications to microcomputer systems. This trend may be a signal to software producers and hardware vendors for increased emphasis on microcomputer accounting and financial software.

Some applications obviously cannot be moved off a mainframe. Applications such as order processing, worldwide networking, big number crunching, DB2 data base programs, and heavy-duty account processing require a high level of computing power and speed that smaller computer systems cannot provide.

D**Impact of
Governmental Policies
and Regulations**

Agency respondents were surveyed to determine the effects of changing federal policies and regulations on computer equipment procurements. Respondents commented on the effects of greater oversight, increased delegation thresholds, and the Trail Boss program. Exhibit IV-15 shows the survey results and the agency responses to each issue.

EXHIBIT IV-15

Impact of Changing Federal Policies and Regulation on Computer Equipment Acquisitions

Policy/Regulation	Unaware of Policy (Percent)	Indicated Impact (Percent)		
		Positive	Negative	None
Greater Oversight	14	23	18	45
Increased Delegation Thresholds	13	53	0	34
*Trail Boss	44	13	0	43

*17% of respondents have not used Trail Boss yet.

Nearly one-half the respondents feel that GSA's increased oversight policies have no effect on the acquisition process. Twenty-three percent (23%) believe greater oversight is positive and that more rules and checks are needed in the procurement cycle. Only 18% of the respondents think greater oversight hinders the procurement process by slowing it down.

New GSA oversight regulations have been added to the Federal Information Resources Management Regulation (FIRMR). In December 1990, GSA published its revised FIRMR, which supersedes the old FIRMR of April 1990. The FIRMR guides acquisition and use of ADP equipment. The most significant policy change is GSA oversight of federal support services. This includes software programming and design, data entry, and systems analysis. The new regulation extends the Delegation of Procurement Authority (DPA) requirement to support services over the threshold of \$2.5 million. The previous FIRMR only required DPAs for agencies' competitive acquisitions of hardware, communication systems, and off-the-shelf software over \$2.5 million.

Fifty-three percent of agency respondents believe increased delegation thresholds make acquisitions easier and less time consuming. GSA has reduced the time it takes to process most Agency Procurement Requests (APRs), even though it is examining all agency acquisitions more carefully.

GSA instituted a new delegations review process in February 1990, which categorizes APRs into three system types according to cost. This new review process is intended to speed up the release of Delegations of Procurement Authority (DPAs). APRs are divided into Type III procurements (worth more than \$100 million), Type II procurements (between \$50 million and \$100 million), and Type I procurements (under \$50 million). Type I buys are reviewed within five days, Type II buys within 20 days, and Type III procurements undergo extensive review.

Kenneth Touloumes, chief of IRMS' Authorization and Management Review Division, says his staff has reduced time for Type I reviews to an average of one to three days. He says it still takes about 20 days for comprehensive reviews, but agencies have been satisfied with the quick turnaround.

Touloumes recommends the Trail Boss program for agencies concerned about APR delays. Under the Trail Boss program, IRMS officials and the agency develop a special procurement charter that is reviewed before the agency submits an APR. Through Trail Boss the agency has a liaison officer for APR processing, and IRMS already knows what is in the APR, so it moves through the DPA process faster.

Fifty-six percent of respondents have participated in the Trail Boss program. Of these, 13% believe this program accelerates the acquisition process, 17% have not used the program at this writing, and 26% believe the program to be ineffective.

The program, initiated in February 1988, trains senior agency IRM managers to handle major ADP acquisitions. Former chief of the program, Robert L. Ross, says Trail Boss has been praised for its excellent training, but it is too soon to determine whether acquisitions are getting better.

Contractors planning to sell to agencies participating in the Trail Boss program may find these agency IRM managers better trained in the acquisition process than other agency counterparts. There may be a noticeable difference in the speed of procurement approval for agencies with Trail Boss-trained managers.

Other policies and regulations that may affect future computer equipment acquisitions include shorter term microcomputer buys, the Procurement Integrity Act, and procurements unrestricted to foreign companies.

In December 1990, GSA's IRM Service announced it would no longer approve massive microcomputer buys with more than a three-year contract. Long-term microcomputer procurements have become too hard to manage, according to Francis A. McDonough, Assistant IRMS Commissioner. Many of these indefinite quantity contracts result in protests

and poor contractor service, and prevent agencies from taking advantage of newer technology. This new policy could make integrators and hardware vendors work harder to sell the same amount of systems. When it comes to micros, they will have to sell more smaller quantity contracts.

The Procurement Integrity Act went back into effect on December 1, 1990. The law prohibits agency procurement officials and contractors from discussing post-government employment, offering or accepting gratuities, and disclosing proprietary or source selection information during a procurement.

Some DoD officials are skeptical of the integrity law. They believe it may stifle legitimate communication between procurement officials and contractors. This may make proposal development, contract negotiation, and communication, in general, more difficult for federal contractors, and make contract awards more unpredictable.

The political community has been debating whether to allow foreign companies to bid on certain U.S. procurements. In February 1991, NASA decided to allow Japanese supercomputer vendors to bid on the Engineering Analysis and Data System (EADS) II procurement at Marshall Space Flight Center. If a vendor such as NEC, Fujitsu, or Hitachi bids and wins, it will be the first time a U.S. government agency has purchased a foreign-made supercomputer.

The issue of opening high-power computing bids to foreign vendors will become more heated as the Bush Administration continues to promote its \$1.9 billion High Performance Computing and Communications program. This effort is designed to maintain U.S. leadership in supercomputing, which will involve the acquisition of leading computer systems. If a large number of future supercomputer procurements are open to foreign bidders, U.S. supercomputer manufacturers and integrators will find themselves facing increased competition in a historically monopolistic market.

E

Acquisition Plans and Preferences

1. Acquisition Plans

Agency respondents were asked to identify any computer equipment acquisition plans for the next three to five years. Exhibit IV-16 shows agencies' planned buying trends over that time period. Fifty percent of the respondents expect to purchase microcomputer systems in the near future, which could mean larger markets for integrators, microcomputer hardware and software vendors, networking companies, and maintenance and service organizations.

EXHIBIT IV-16

Planned Computer Equipment Acquisitions Over the Next Three to Five Years

Planned Equipment Purchases	Percentage of Respondent Agencies
Microcomputers	50
Mainframes	22
Workstations	16
Midsized Systems	6
Supercomputers	6

In keeping with new GSA regulations, these microcomputer procurements are likely to be more streamlined, smaller, and more manageable contracts, compared to the massive microcomputer contracts awarded in the past. Historically, only large integrators had the resources to bid on big microcomputer procurements. These smaller acquisitions could be conducted more quickly and efficiently, allowing a wider variety of vendors to bid and therefore increasing competition. Microcomputer vendors of all sizes may need to focus on developing a competitive edge, such as increased service or maintenance, in order to keep up with increasing competition.

The Veterans Affairs VBA project and DoD's Lapheld II contract are two examples of upcoming microcomputer procurements. The Veterans Affairs Department issued a request for comments in December 1990 on the Veterans Benefit Administration (VBA) modernization project. The VBA project will bring microcomputers to 600 VA locations. DoD's Lapheld II contract is expected to be awarded by the summer of 1991. It will supply the government with as many as 75,000 new laptop systems.

Twenty-two percent of INPUT's agency respondents believe mainframe purchases will dominate their buying in the next three to five years. Applications expected to run on these new systems include administrative functions, scientific applications, finance, payroll, accounting, data analysis, and E-mail.

Six percent of the respondents plan to acquire supercomputers in the near future for applications such as science and engineering. One planned supercomputer procurement will take place at NASA Ames Research Center. This procurement will provide a supercomputer and an advanced parallel processor to the lab's Numerical Aerodynamics Simulation (NAS) facility. A request for proposal was due out in March 1991 with award scheduled for the fall of 1991.

Exhibit IV-17 shows the average proportion of each respondent agency's budget to be devoted to the five system types. In comparison to Exhibit IV-16, this exhibit shows agencies expect to set aside the greatest amount of funding for microcomputer procurements. The average equipment budget for respondent agencies in fiscal year 1991 is \$22.2 million. This means approximately \$10.2 million of this budget within each respondent agency is devoted to the acquisition of microcomputers. Since microcomputers have low unit prices and almost half of each budget is set aside for their acquisition, INPUT expects an extremely large number of units to be purchased in the next three to five years. This is good news for microcomputer vendors, integrators, software vendors, and networking specialists.

EXHIBIT IV-17

Average Equipment Budget by System Size

System Size	Average Percent of Budget
Microcomputers	46
Workstations	21
Midsized Systems	14
Mainframes	18
Supercomputers	1

2. Method of Acquisition

Agency respondents were asked to identify the method by which they acquire their computer equipment inventory. Exhibit IV-18 shows the percentage of respondents acquiring each type of computer equipment under the different acquisition methods.

EXHIBIT IV-18

Computer Acquisition Methods by System Size

Acquisition Method	Percent of Respondent Agencies				
	Micro-computer	Work-station	Mid-sized	Main-frame	Super-computer
Requirements Contract	48	42	29	25	14
GSA Schedule	89	75	39	19	0
RFP	40	58	67	94	75
Excess Equipment	16	16	11	13	0

An astounding 89% of agency respondents purchased microcomputers from GSA schedules, and 75% purchased workstations from GSA schedules. This figure may inspire hardware vendors to negotiate a GSA schedule contract, if they are not currently operating with one. GSA schedules accelerate the procurement process for small buys. The unit prices for the equipment being purchased are already established, and purchasing from a GSA schedule is less time consuming than most other acquisition methods.

Respondents indicate that larger systems such as minicomputers, mainframes, and supercomputers are predominantly purchased through requests for proposal (RFPs). Acquiring equipment for a specific purpose using an RFP is the most time consuming acquisition method. Acquisitions of this type could take six months to three years, depending on the size of the procurement.

Hardware vendors or systems integrators interested in bidding these large systems may wish to refine their proposal-writing process and procedures to gain a competitive edge. Software developers, small hardware vendors, and service organizations may wish to pursue subcontracting opportunities with large, experienced integrators for these procurements.

INPUT also asked agency respondents the acquisition method they most prefer. Exhibit IV-19 shows the distribution of agency respondents' preferred acquisition methods.

EXHIBIT IV-19

Acquisition Method Preference	
Acquisition Method Preferred	Percent of Respondents
No Preference	36
RFP	32
GSA Schedule	24
Requirements	12

Most of the agency respondents have no preference for acquisition method. Surprisingly, 32% of the respondents favor RFPs as an acquisition method. As stated previously, procuring computer equipment by developing an RFP is the most time consuming acquisition method. But by using this method, the agency can advertise its exact needs and allow the bidders to determine the equipment solution by evaluating all available options. This process saves the agency time and money by making some of the evaluation process external.

The agencies' preference of acquisitions through RFPs re-emphasizes the importance of a finely tuned proposal development process for contractors.

INPUT surveyed federal agencies to determine the market for equipment leasing. In the last 10 years, agencies have tended to buy rather than lease their computer systems. INPUT asked agency respondents if they expect any shift in this trend. Eighty-eight percent of the respondents expect agencies to continue purchasing computer equipment rather than leasing. They feel leasing is more expensive in the long run, not cost effective, and that buying is now easier.

Twelve percent (12) of the respondents expect a shift from buying to leasing, because they believe it is easier to lease, systems are getting too expensive to buy, and leasing allows agencies to keep up with technological advances. The fact that only a small number of respondents envision an increase in leasing signals a grim future for companies concentrating

on leasing computer equipment to the federal government. These contractors could focus on increasing hardware and software sales, service and maintenance sales, and federal outsourcing opportunities.

3. Selection Criteria

Federal agencies evaluate computer equipment purchases by use of selection criteria. The relative importance of each criterion is listed in Exhibit IV-20. The exhibit states the mean importance for each of the presented characteristics, where a score of five signifies most important and one signifies least important.

EXHIBIT IV-20

Selection Criteria	
Criteria	Mean Importance
Equipment Performance	4.6
Equipment Reliability	4.5
Software Features	4.1
Vendor's Support Reputation	3.8
Ease of Implementation	3.8
Product Price	3.7
Vendor's Federal Experience	2.5
Other Criteria Noted by Respondents (Noted by only one respondent) <ul style="list-style-type: none"> - Connectivity/Compatibility - Compliance with Standards - Expansion Capacity 	

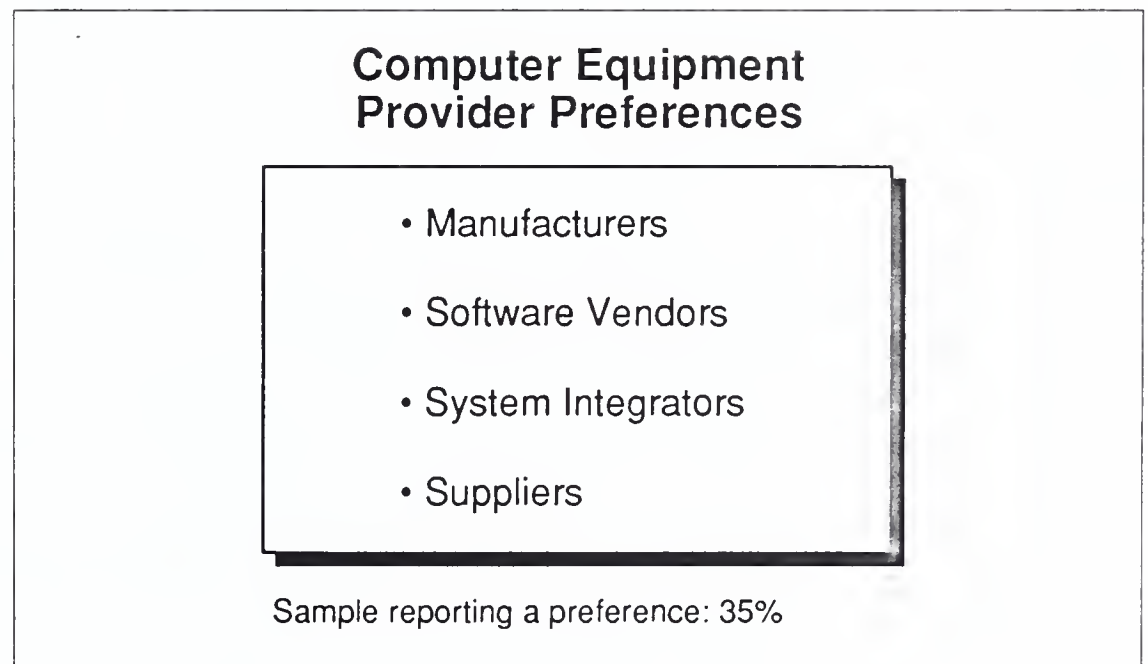
The exhibit emphasizes the importance of equipment performance, equipment reliability, and software features to federal agencies when evaluating potential computer equipment buys. Vendors and integrators need to maintain a reputation for high-quality equipment, systems, and services. Vendors should also be aware of these selection criteria when they are developing proposals, quotes, or sealed bids.

Another important issue involved in soliciting computer equipment is whether to acquire used or new equipment. Agencies must now justify "new only" buys. GSA issued a new set of guidelines governing procurements of used ADP equipment in January 1991. IRM officials first issued used-equipment guidelines in September 1990, opening the federal market to used computers. The guidelines state used equipment must perform like new and must meet all of the original manufacturer's operating specifications and standards. The term "used equipment" applies to previously installed mainframes and minicomputer equipment, including reconditioned and refurbished items. Smaller systems, such as micros and workstations, become obsolete quickly, making this type of used equipment impractical. Used-equipment dealers may find a niche within the federal market that has not existed in the past.

4. Preference for Type of Vendor

Agency respondents were asked their preference for the type of computer equipment vendor. Sixty-five percent of the respondents indicated no preference. Exhibit IV-21 shows the provider rankings for those respondents who favor a certain type of provider

EXHIBIT IV-21



Most agency respondents have no provider preference, giving all computer equipment suppliers equal status at the beginning of a procurement. Those agencies who do have a preference favor computer equipment manufacturers as system providers. This information seems to contradict the preferred acquisition method of RFPs. Manufacturers typically sell from GSA schedules, while systems integrators and professional service firms specialize in providing proposals in response to RFPs. This may suggest that agencies prefer to buy single units of equipment from manufacturers, but favor RFPs and systems integrators when procuring large computer systems involving different types of hardware, software, and services.

F**Trends**

In order to determine industry trends affecting computer equipment acquisition and use, INPUT asked agency respondents to identify those trends affecting computer acquisition within their agencies. Exhibit IV-22 lists industry trends agency respondents believe will affect computer acquisition efforts.

Eighty percent of the respondents stated that current industry trends are

EXHIBIT IV-22

Industry Trends Affecting Computer Equipment Acquisition

- Increased merger and acquisition activity
- Increased Japanese penetration
- Increased financial strain for U.S. companies caused by the recession
- Increased competition among federal contractors

having no effect on computer equipment acquisitions or use within their agencies. Sixteen percent believe these industry trends are having an adverse effect on procurements, while 4% believe they are having a positive effect on procurements.

Several respondents cited difficulty in obtaining foreign computer equipment and that American-made equipment was not suitable in certain instances. These respondents believe market trends adversely affect the acquisition process. Japanese and other foreign equipment is available, but the U.S. procurement process makes it difficult to obtain.

Other respondents believe companies forced into financial hardship provide poorer service and support after the sale, an adverse effect of the recession. It will become increasingly important for contractors to assure potential government clients that service, support, and maintenance will remain high regardless of the company's merger or financial status.

A small percentage of agency respondents believe the federal contracting industry is becoming more competitive, thus forcing prices down and benefiting procuring agencies. Contractors should study the competition and not bid blindly. Pricing awareness will be a key factor in increasing contract awards as the market becomes more competitive and price-oriented.

2. Technology Trends

Changing trends in technology often greatly affect acquisitions of computer equipment. Rapidly changing technology makes computer equipment procurements difficult, because agencies attempt to purchase items that will not quickly become obsolete.

Agency respondents indicated several technological changes that affect their agencies' acquisitions. Exhibit IV-23 lists these trends in the order of frequency of mention by respondents.

EXHIBIT IV-23

Technical Trends Affecting Computer Equipment Acquisition

- System obsolescence
- New technology
- Increased utilization of systems
- Increased presence of engineering change clauses in contracts
- Refocus on microcomputers
- Increased budgetary restrictions limiting agencies' ability to keep up with technology

Most agency respondents cited the never-ending battle to fight system obsolescence as a problem with rapidly changing technology. This problem is compounded by the slow and complex procurement process. By installation time, some systems are already obsolete. Upgrading systems to remain on the leading edge of technology is an endless battle for government agencies.

Also, budget restrictions are making it more difficult for agencies to stay on top of technology. With less money, it is more difficult to buy the most advanced and best quality equipment.

One solution to these problems is to develop contingency plans within the contract allowing for upgrades of the system as technology advances. Prenegotiated upgrades may be referred to as engineering clauses or technology refreshment. Contractors may consider offering this type of

clause when addressing technology changes in their proposals. Negotiating upgrades in the event of technological advances can give a contractor an edge over its competitors.

Agencies agree there is an increased emphasis on microcomputers. With increased technology, micros have become more powerful, causing many agencies to move applications from mainframes to micros. This is causing a shift to distributed processing and is creating a growing market for network and communication vendors. The increased need for micros is also good news for hardware vendors.

3. Budget Constraints

INPUT asked agency respondents to voice their opinions on the impact of budgetary constraints on computer equipment acquisitions. Exhibit IV-24 shows the respondents' replies and the percentage of respondents with similar opinions.

EXHIBIT IV-24

Impact of Budgetary Constraints on Computer Equipment Acquisitions

Replies	Percentage of Respondents
No Effect	40
Slows/Delays Acquisition	35
No Budget for Additional Information System Acquisitions	15
High Priority Acquisitions Only	10

An unexpected 40% of the respondents stated that budgetary constraints have not hindered their agencies' computer equipment acquisitions, while 35% have experienced such delays. The high percentage of respondents experiencing no budget barriers for computer equipment acquisitions may be due to little ADP budget cutting within the respondents' agencies. Some federal agencies are actually obtaining increased funding for information technology.

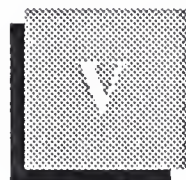
Despite concerns about budget cuts, it appears that federal IRM spending will remain healthy during the next few years. IRM spending has increased an average of 7.9% in the past two years. The government's total information technology budget grew 6.3% annually between fiscal 1982 and fiscal 1989.

Agencies receiving the largest IRM budget increases, according to the Office of Management and Budget, are the Transportation Department, with a 19.9% increase to \$429.7 million; GSA, with a 19.7% increase to \$546 million; NASA, with a 17.9% increase to \$1.8 billion; and Treasury, with a 15% increase to \$1.3 billion.

More stringent budgets have forced GSA to review agencies' requests for procurement more closely before granting delegation of procurement authority (DPA). Although GSA's review process has been reorganized to run more efficiently, it still slows the procurement process: The larger the procurement, the longer the GSA review process.

Fifteen percent of the respondents stated they have no budget for additional information systems acquisitions due to federal budget cuts. In the Department of Defense alone, a \$418 million cut in IRM spending was approved in October 1990 by the House Appropriations Committee. The Armed Services Committee cut \$135 million from each of the three services and about \$45 million from defense agencies. The reductions were based on the Corporate Information Management plan to create single systems.

DoD is not the only department hit by cuts. The 1991 budget agreement halts a planned expansion of Justice's Project Eagle, lowers the budget for Forest Service's Project 615, and puts the Defense Logistic Agency's Fedlog program under close observation.



Competitive Trends

A

Installation Profile by Brand

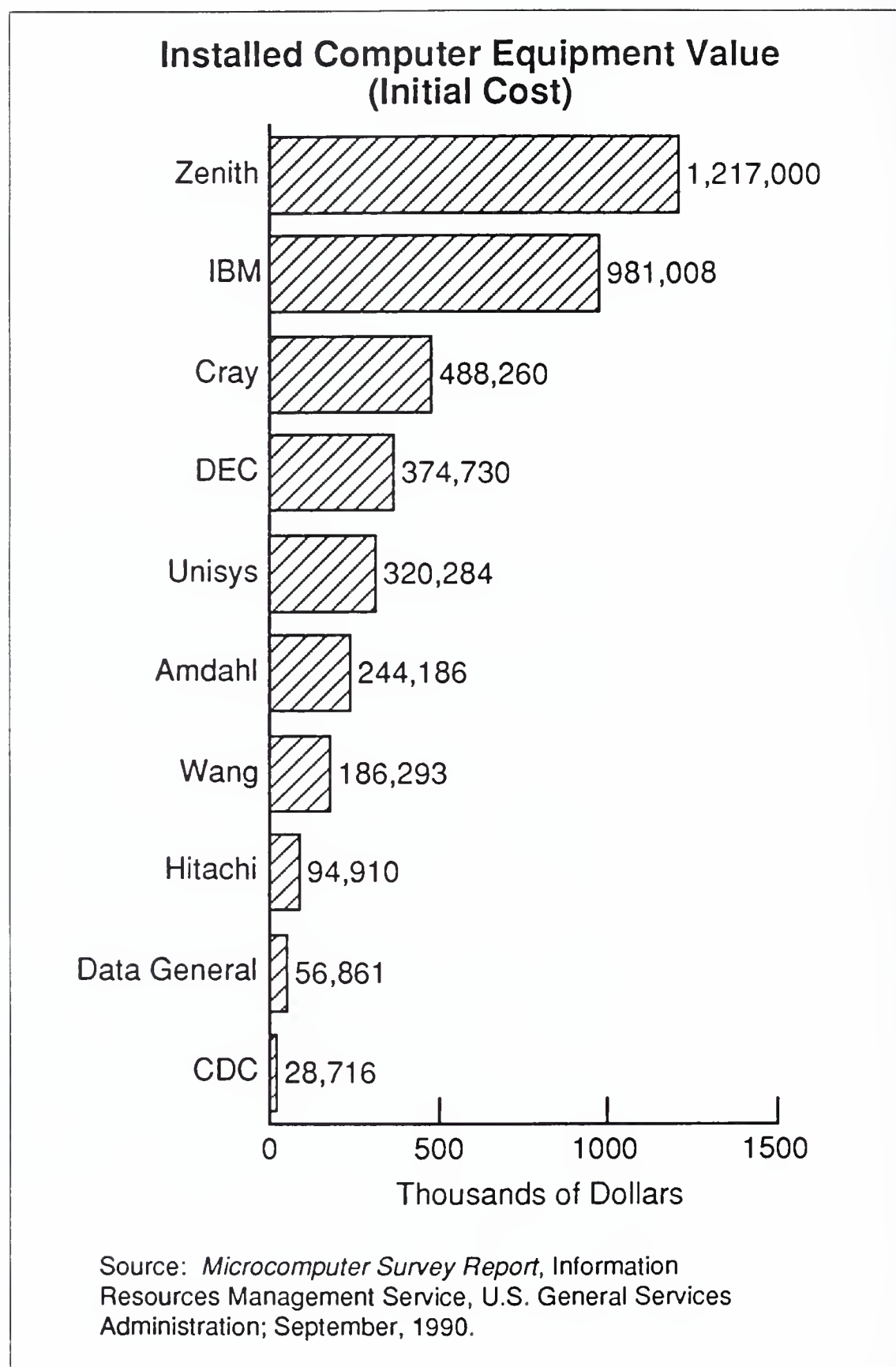
This section covers the brands, inventory volume, and inventory value of computer equipment installed throughout federal agencies. For purposes of this report, inventory value equals the initial cost of the computer equipment. The computer equipment installation profiles are further broken into microcomputers, workstations, midsize computers, mainframes, and supercomputers.

A wide range of computer systems and computer equipment brands is currently installed throughout the government. Exhibit V-1 lists the top 10 brands of installed equipment according to reported initial equipment cost.

Microcomputer information used to derive the following chart was extracted from the *GSA Microcomputer Survey Report*. The workstation, midsize computer, mainframe, and supercomputer information used to develop the remainder of the chart came from the CI data base. Manipulating the data in this way compensates for the difference in CI's and INPUT's definition of microcomputer. Since no totally reliable or comprehensive inventory list exists, it is likely that the value of each brand's installed base is higher. However, the exhibit is useful for comparing relative market penetration.

INPUT LIBRARY

EXHIBIT V-1



Zenith dominates the list mainly due to the Air Force's Desktop II procurement under which approximately 400,000 PCs were purchased. Zenith no longer sells the most micros, even though it still has the largest base. Three DoD contracts—Desktop III, Army SMC, and Navy COMPANION—are now driving the market.

IBM and Cray place second and third on the list because of the large number of IBM mainframes and Cray supercomputers currently installed within the federal government. Because government agencies tend to purchase familiar computer equipment brands, government contractors can rely on the top equipment brands—Zenith, IBM, Cray, DEC, Amdahl, and Unisys—to give weight to their bids.

1. Microcomputer Installations

The brand installations must be broken into the five computer system subsets in order to analyze the data properly. Exhibits V-2 through V-12 depict brand saturation for microcomputers, workstations, midsized computers, mainframes, and supercomputers.

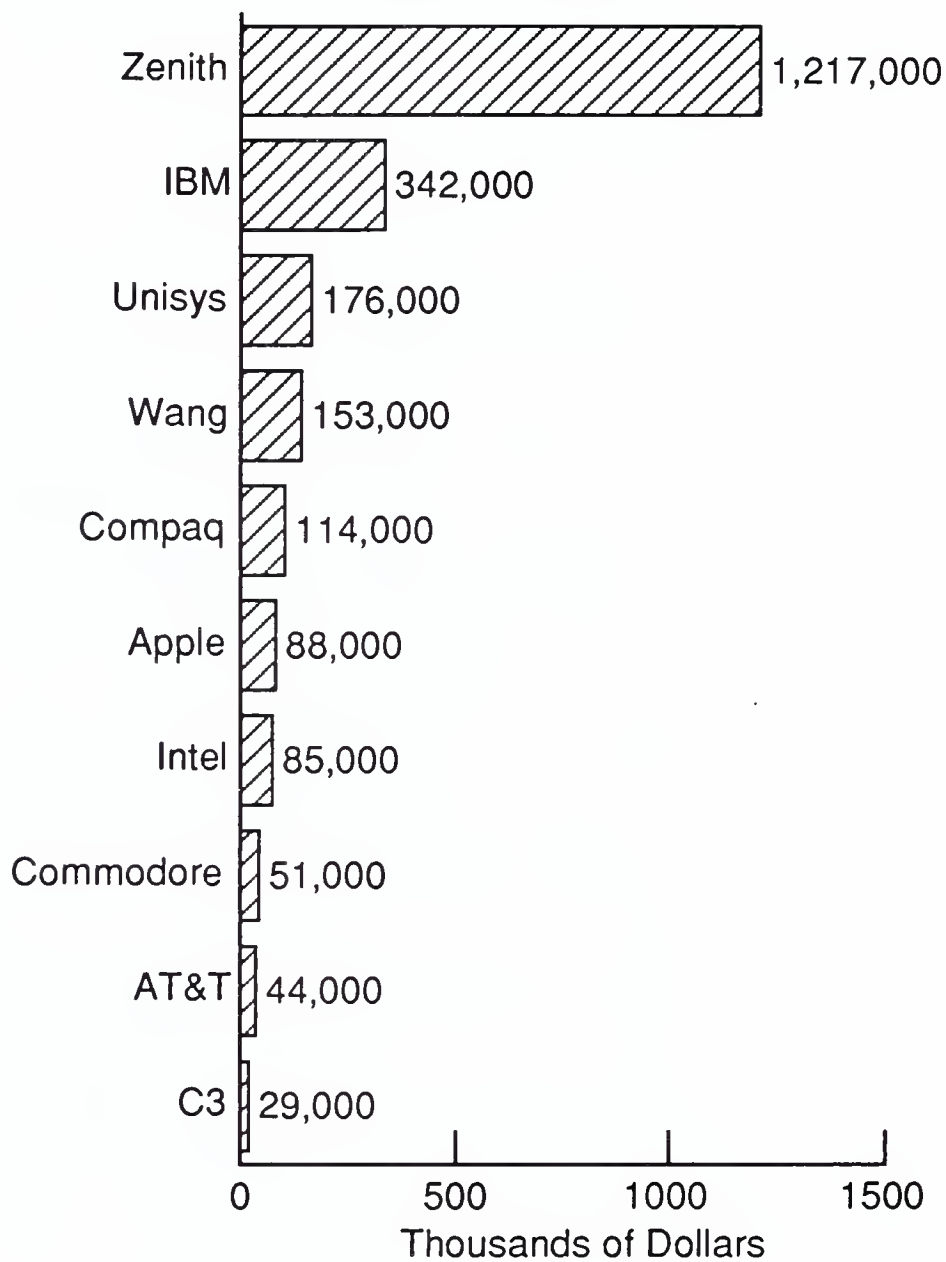
According to GSA's *Microcomputer Survey Report*, the federal government owns a little over one million microcomputers produced by 987 different manufacturers. Exhibit V-2 shows the leading federal microcomputer brands by inventory value. The total value of the government microcomputer inventory is \$2.8 billion, of which 82% is spread among the top 10 manufacturers.

Zenith was the leading brand with \$1.2 billion in inventory value, or 43% of total federal microcomputer inventory value. IBM was second with 12% of all agency microcomputer inventory value. As equipment deliveries from the three DoD contracts increase, the relative market shares will change drastically.

Exhibit V-3 depicts the top 10 microcomputer brands ranked by the number of units installed. Overall, these top 10 brands account for 84% of the total microcomputer units installed in the government. Zenith, IBM, Unisys, and Wang were also leaders in this category. Again, Zenith's market domination, shown in both exhibits, may be explained by the Air Force's Desktop II acquisition. Market share here will also change but probably at a slower pace.

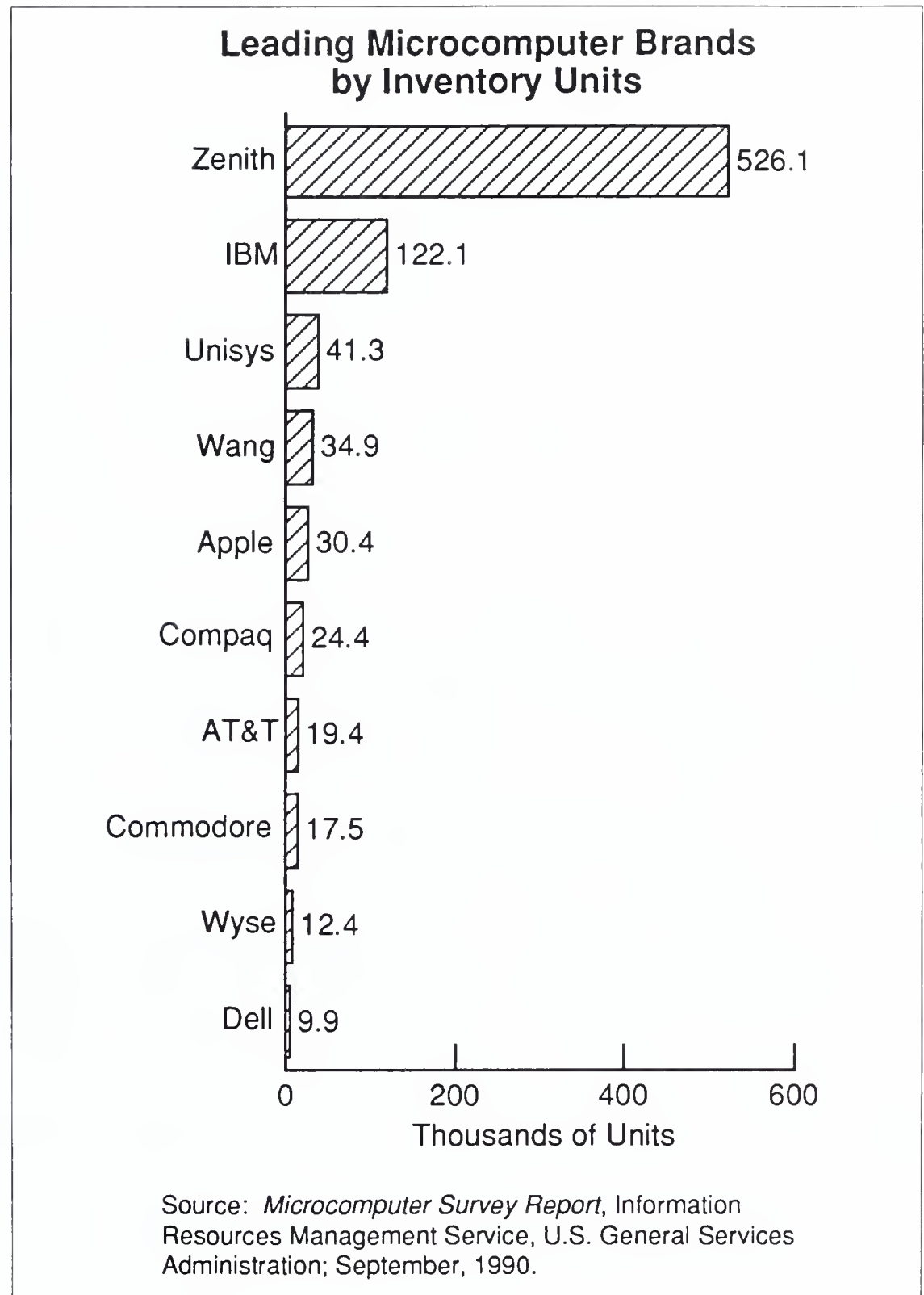
The two exhibits are similar, but there are differences, which are due to the average cost per unit for the different manufacturers. Apple shows 30,400 federal microcomputer installations with an average cost of \$2,895 per unit. On the other hand, Compaq shows only 24,400 federal microcomputer installations with an average cost of \$4,672 per unit. Therefore, Compaq ranks higher than Apple for installed inventory value, while Apple ranks higher for number of units installed.

EXHIBIT V-2

**Leading Microcomputer Brands by Value
(Initial Cost)**

Source: *Microcomputer Survey Report*, Information Resources Management Service, U.S. General Services Administration; September, 1990.

EXHIBIT V-3



The average cost per unit for the top 10 microcomputer brands is approximately \$2,800. The average cost per unit for Unisys, Wang, and Compaq computers is about \$4,400. Comparing the two graphs and the average costs per unit of inventory shows that in certain instances agencies are willing to pay almost twice as much for computers manufactured by Unisys, Wang, or Compaq. Contractors may be able to bid higher prices on these three valued brands, depending on available features. However, with 386- and 486-based units becoming more common, brand loyalty will likely disappear.

All of the microcomputer brands pictured in Exhibits V-2 and V-3 are highly respected and known for quality. However, as already indicated, INPUT expects brands to matter little in future buys.

Observing what the top brands within each agency are shows contractors which agencies may be more receptive to less familiar microcomputer brands, and which agencies adhere to conventional brands. Exhibit V-4 lists the top microcomputer brand installed at each of the large federal agencies.

EXHIBIT V-4

Top Microcomputer Brands at the Top Agencies

Agency	Brand	Microcomputer Brand Installation Value (\$ Thousands)
Army	Zenith	319,437
Navy	Zenith	442,987
Air Force	Zenith	330,138
NASA	IBM	36,825
Treasury	IBM	63,378
DoD Other	Zenith	44,532
Justice	IBM	36,218
GSA	Unisys	67,144
Transportation	Micro Express	16,765
Agriculture	AT&T	35,650
Health & Human Services	IBM	26,308
Interior	IBM	9,752
Commerce	IBM	16,144
Energy	IBM	16,254
Labor	Computer Sc. Tech	4,499
State	Wang	9,478
Education	Compaq	1,038

Agencies ranked according to units of inventory.

Source: *Microcomputer Survey Report*, Information Resources Management Service, U.S. General Services Administration; September, 1990.

DoD agencies and departments seem to favor Zenith micros (contracts currently in place will change this), while NASA, Treasury, Justice, Health and Human Services, Interior, Commerce, and Energy departments favor IBM micros. Vendors and contractors should focus on these hardware brands and compatible software when targeting these agencies. To the extent that brand loyalty still exists, it may matter most at these agencies.

Contractors will find Transportation, Labor, State, and Education departments more open to lesser known brands of equipment. Currently, the Department of Transportation's microcomputer inventory is dominated by Micro Express computers. The Department of Labor's top microcomputer brand is Computer Science Technology. The State Department's top brand is Wang, and the Education Department's top brand is Compaq.

2. Workstation Installations

Exhibit V-5 lists the leading workstation brands within the federal government. Sun Microsystems holds the top spot with 5,890 workstation installations at a value of \$126.6 million. Hewlett-Packard (HP) follows with 967 workstations worth \$31.1 million. DEC is third with 1,675 installations worth \$27.6 million.

Sun Microsystems has 52% of the current installed federal workstation base in terms of units, with 47% of total installation value. Sun's systems are medianly priced among the other workstation manufacturers with an average cost of \$21,487. Silicon Graphics offers the highest priced systems, at approximately \$36,275 each, among these top manufacturers. Sun's domination of the workstation market is a signal to contractors that market penetration could be difficult with a lesser known workstation brand.

Exhibit V-6 lists the top workstation brands currently installed at the top federal agencies.

Exhibit V-7 shows that the agencies most open to workstations other than Sun are Army, Transportation, Agriculture, Justice, and Treasury.

EXHIBIT V-5

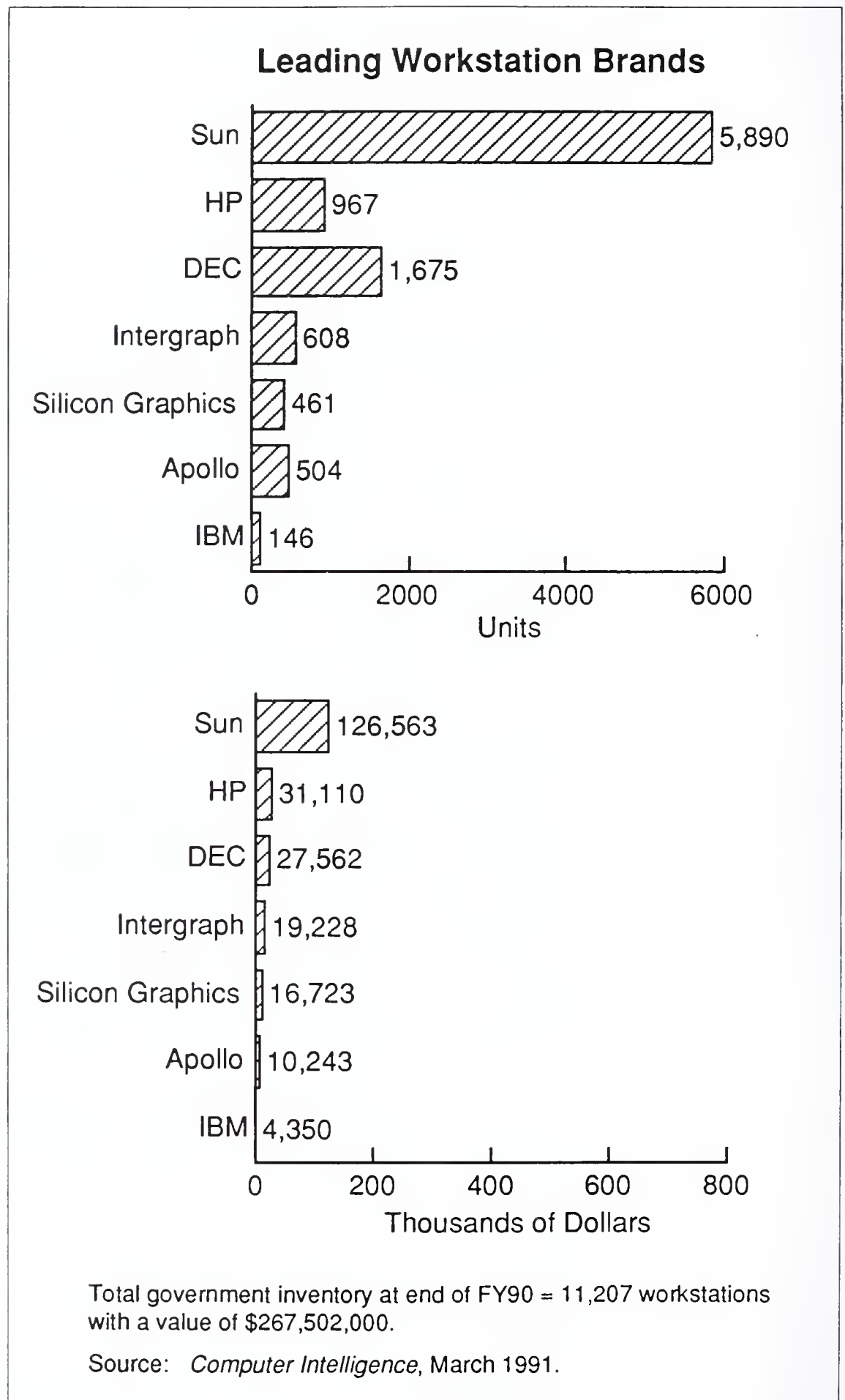


EXHIBIT V-6

Top Workstation Brands at the Top Agencies

Agency	Brand	Workstation Brand Installation Value (\$ Thousands)
Energy	Sun	50,759
NASA	Sun	16,986
Army	Intergraph	10,411
Navy	Sun	12,893
Commerce	Sun	5,360
Air Force	Sun	6,374
Other DoD	Sun	3,843
Health & Human Services	Sun	2,841
Interior	Sun	2,009
Transportation	Apollo	1,341
Agriculture	Data General	657
Justice	Allicon	750
Labor	Sun	1,123
Treasury	Apollo	154

Agencies ranked according to units of inventory.

Source: *Computer Intelligence*, March 1991.

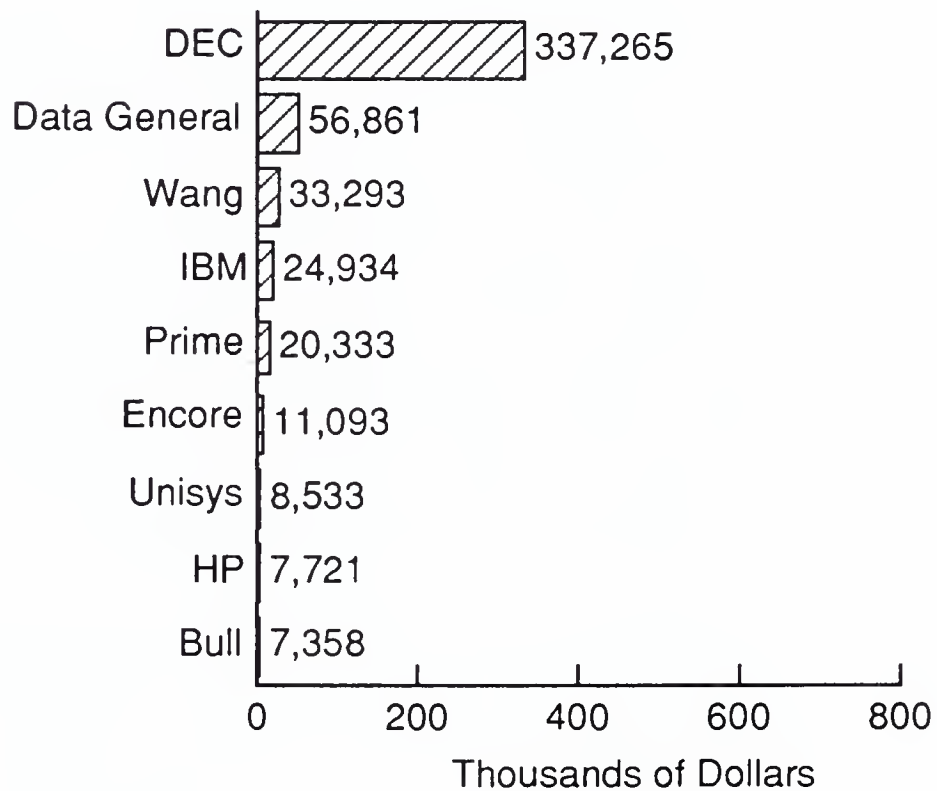
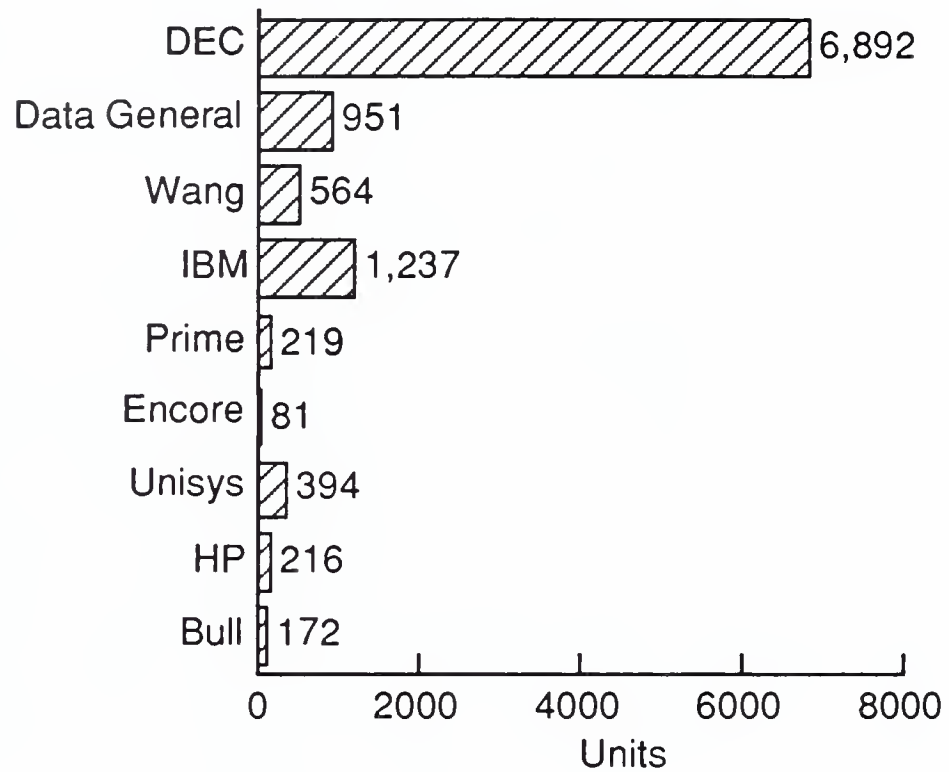
3. Midsized Computer Installations

Exhibit V-8 shows the leading brands of midsized computers within the federal government. DEC corners the market on minicomputers with an installation base of 6,892 systems. DEC manufactured 58% of the midsized computers currently installed. These DEC systems are worth 62% of the total value of all federal midsized computer systems.

DEC is one of the oldest midrange computer manufacturers in the U.S. This, plus the historic popularity of the VAX architecture, explains why it holds such a large portion of the federal market. DEC's equipment is highly respected in the federal arena, but much of it is becoming out-dated. This may be a good opportunity for contractors to offer new midrange equipment or encourage downsizing, upgrades, or outsourcing.

EXHIBIT V-7

Leading Midsized Computer Brands



Total government inventory at the end of FY90 = 11,841 midsize computers with a value of \$541,349,000.

Source: *Computer Intelligence*, March 1991.

Exhibit V-8 lists the top midsize computer brands within each of the large federal agencies and re-emphasizes DEC's prominence in this market. Other top brands integrators should consider when assembling bids are Data General, Prime, Wang, and Harris. Software, maintenance, and service firms may look forward to procurements for support of the currently installed brands, as well as new installations.

EXHIBIT V-8

Top Midsize Computer Brands at the Top Agencies

Agency	Brand	Midsize Brand Installation Value (\$ Thousands)
Agriculture	Data General	44,924
Navy	DEC	57,323
Energy	DEC	47,694
Air Force	DEC	55,270
Army	DEC	26,517
NASA	DEC	32,828
Interior	Prime	6,575
Treasury	DEC	6,293
Health & Human Services	DEC	5,931
Commerce	DEC	7,873
DoD Other	DEC	5,828
Transportation	Data General	2,456
Justice	Data General	1,296
Labor	Harris	520
Education	Wang	610
State	Wang	1,088

Agencies ranked according to units of inventory.

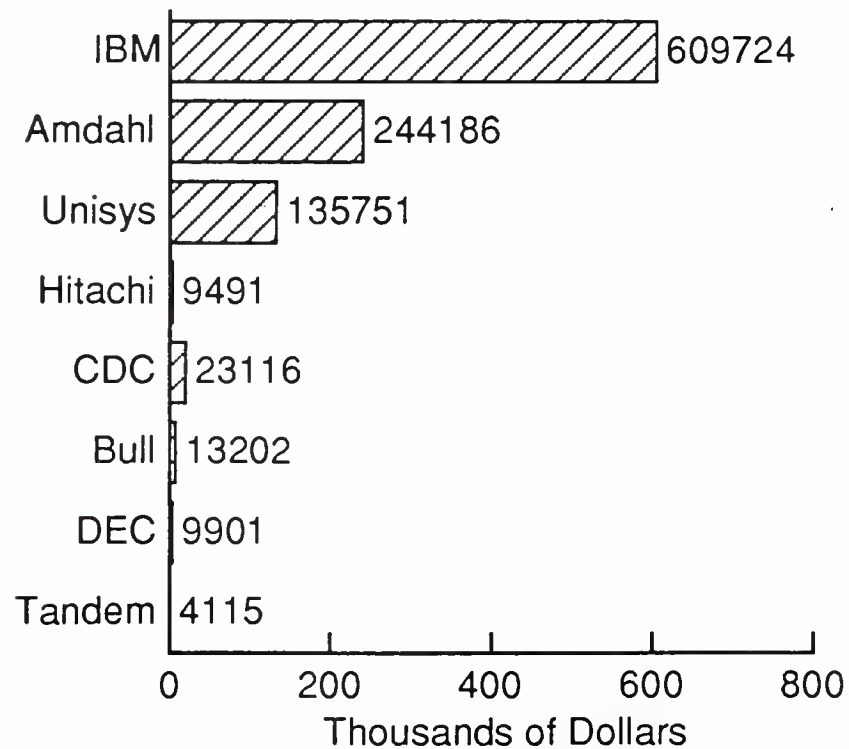
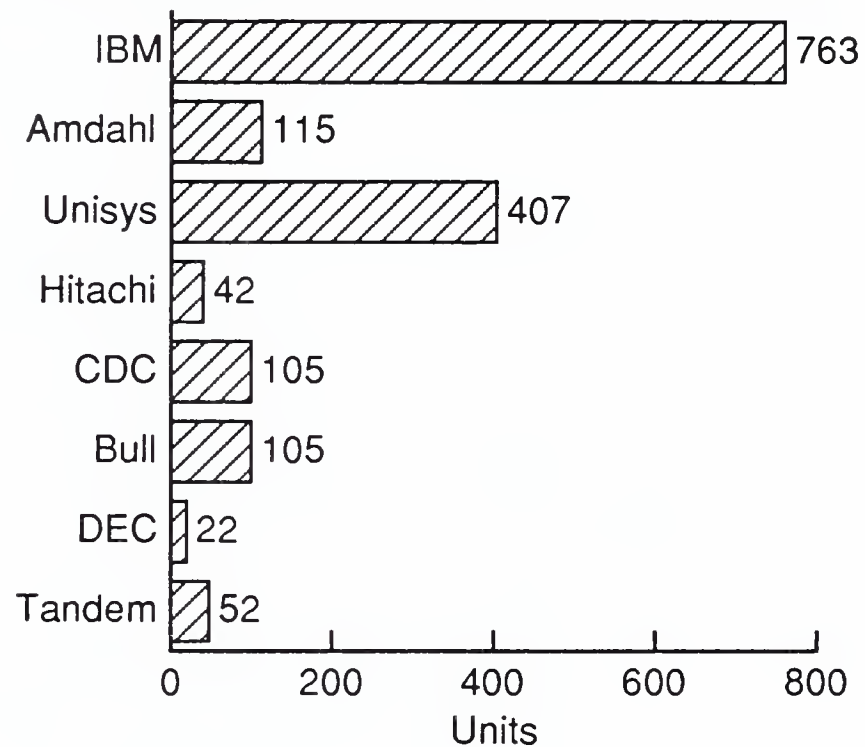
Source: *Computer Intelligence*, March 1991.

4. Mainframe Installations

Exhibit V-9 shows the leading federal mainframe computer brands. IBM maintains the largest presence within the government among mainframe computer manufacturers.

EXHIBIT V-9

Leading Mainframe Computer Brands



Total government inventory at the end of FY90 = 1,626 mainframes with a total value of \$1,138,578,000.

Source: *Computer Intelligence*, March 1991.

Forty-seven percent of all currently installed mainframes are IBM. Fifty-three and one-half percent of total federal mainframe value comes from these IBM systems. The computed average cost for IBM mainframes equals \$799,114. Amdahl ranks second in mainframe installations with 115 at an average cost of \$212,335 per system.

IBM is one of the oldest producers of mainframe computer systems. IBM mainframes have a reputation of high performance and dependability, but many of the systems in use today fall behind in technology. Hardware vendors may find a market for new IBM mainframes, and other contractors may find opportunities to provide software and services for the new and old IBM mainframe systems.

Unisys also fares well in the number of current system installations, which may become a commodity product. According to the press, Unisys mainframes are first in reliability and customer satisfaction. In a recent survey, Unisys systems scored highest in ease of operation and ease of conversion, and they gained high scores for their compilers and assemblers. Two of Amdahl's mainframe systems closely followed Unisys. These findings are encouraging for non-IBM vendors working in a market historically dominated by IBM mainframes.

Exhibit V-10 lists the top mainframe brands currently installed in the largest federal agencies. Contractors may be most successful selling IBM equipment to the agencies with a large IBM installation base and by selling Amdahl equipment to those agencies with a large Amdahl base.

IBM holds such a large share of the federal mainframe market that there appears to be a bias toward IBM systems. John Conyers, Jr., Chairman of the House Government Operations Committee, reopened hearings on the federal favoritism toward IBM Corp. in September 1990. Conyers asserts IBM dominates Treasury, Agriculture, and Health and Human Services so heavily that it would be unwise for compatible vendors to attempt to solicit mainframe contracts. Conyers asserts IBM-compatible procurements accounted for 64% of the compatibility-limited procurements and 52% of all federal mainframe procurements between October 1985 and March 1989.

Conyers' committee may seek review of specific procurements in order to determine patterns of abuse in mainframe acquisitions. The GSA delegation process will also be reviewed.

If the committee finds significant evidence to prove IBM bias, new doors may open in the federal market for other mainframe vendors. On the other hand, life could become tougher for IBM vendors who would be required to prove that an IBM product is the only feasible solution. Also, mainframe acquisitions would undergo closer scrutiny by GSA delegation authorities, thus slowing down the procurements process. Compatibility-limited procurements could become more cumbersome and time consuming.

EXHIBIT V-10

Top Mainframe Brands at the Top Agencies

Agency	Brand	Mainframe Brand Installation Value (\$ Thousands)
Air Force	Unisys	77,971
Army	IBM	40,231
Navy	Amdahl	55,984
Energy	IBM	61,424
Treasury	IBM	32,278
DoD Other	IBM	29,586
Transportation	IBM	19,463
NASA	Amdahl	16,640
Health & Human Services	IBM	71,889
Commerce	Amdahl	11,000
Justice	IBM	28,250
Agriculture	IBM	37,766
Interior	Amdahl	4,120
State	IBM	1,075

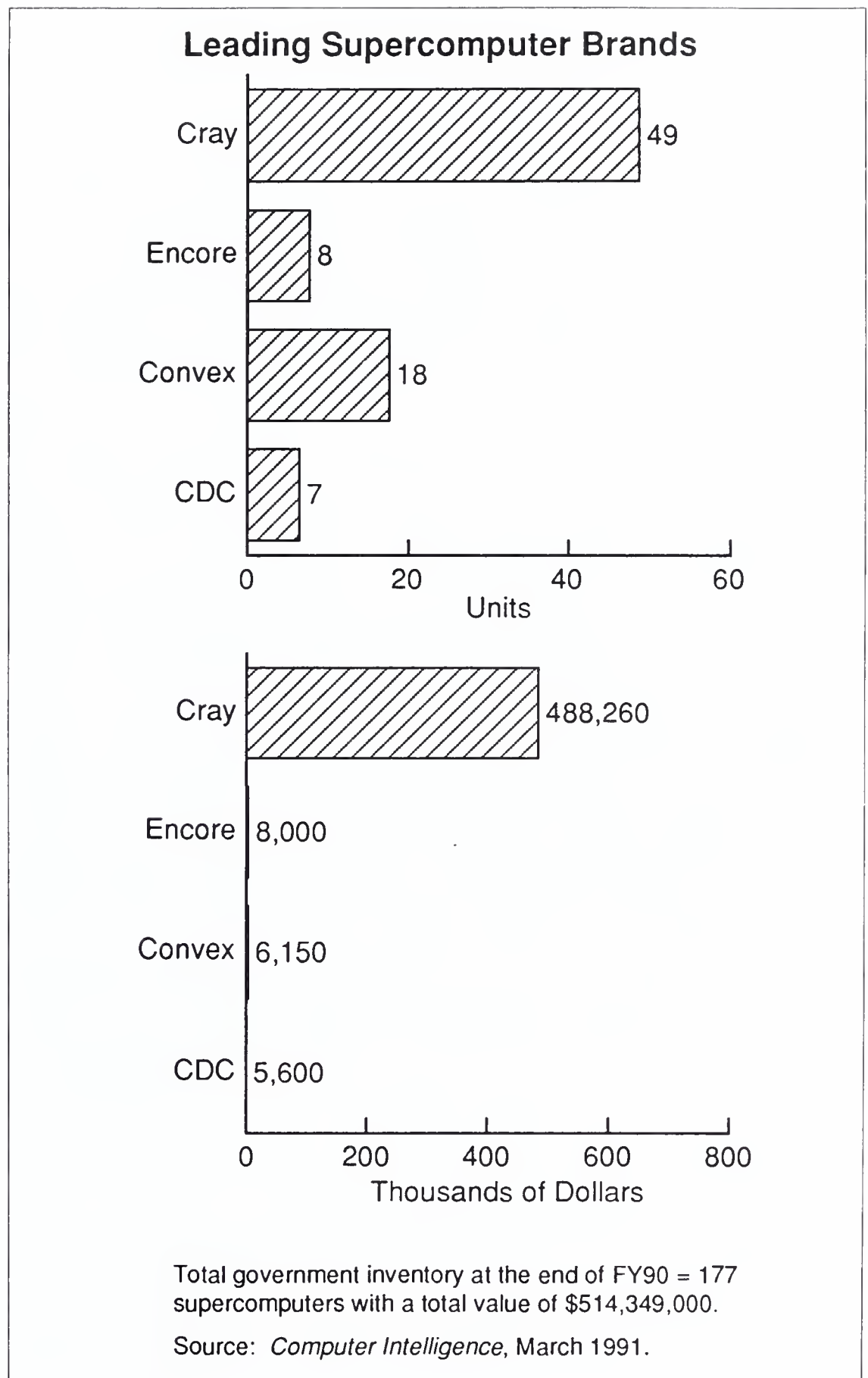
Agencies ranked according to units of inventory.

Source: *Computer Intelligence*, March 1991.

5. Supercomputer Installations

Leading brands of supercomputers used by the federal government are listed in Exhibit V-11. Cray by far leads all of the competition in supercomputer installations within the federal arena. Cray has an installation base of 49 systems, which is 25% of the total number of installed systems worth 93% of the total value. Cray's supercomputers are the most expensive, with an average value of \$9.9 million dollars per system. The large number of installations, despite the high price, suggests Cray may manufacture the best quality supercomputers.

EXHIBIT V-11



Agencies that need the most available computing capacity with the best overall performance, and have little price limitation, traditionally choose Cray. However, for procurements requiring lower prices and reasonable

computing capacity and speed, opportunities exist for less well-known supercomputer systems. Systems such as Encore, Convex, Control Data Corp. (CDC), and Alliant are installed throughout the federal government and carry an average value of about \$1 million.

Exhibit V-12 lists the top federal supercomputer vendors corresponding to each agency. Cray is the best product on the market, and thus dominates the federal sector. But agencies possessing several supercomputer systems typically own several less familiar brands along with their Cray systems. Opportunities exist for other supercomputer suppliers as long as the system they bid meets the procurement specifications. Further, GSA has proposed an opening to Japanese firms in supercomputer procurements.

EXHIBIT V-12

Top Supercomputer Brands at the Top Agencies

Agency	Brand	Mainframe Brand Installation Value (\$ Thousands)
NASA	Cray	218,000
Navy	Cray	25,000
Energy	Cray	93,380
DoD Other	Encore	7,000
Army	Cray	54,000
Air Force	Cray	46,880
Commerce	Cray	18,000
Health & Human Services	Cray	5,000

Agencies ranked according to units of inventory.

Source: *Computer Intelligence*, March, 1991.

Overall, service, maintenance, software, and hardware vendors may gain a competitive advantage by studying agencies' current preferred brands of supercomputers, and using this information to develop a proposal or bid that follows the procurement history and current needs of that agency.

6. Communications Equipment and Brands

Exhibit V-13 depicts the top ten leading communications equipment brands according to the number of systems installed. Hayes and AT&T collectively hold 30% of the total federal installation base by units of inventory.

EXHIBIT V-13

Leading Data Communications Equipment Brands

- | | |
|---------------|----------------|
| • Hayes | • Gandalf |
| • AT&T | • Multi-tech |
| • Codex | • Gen-datacomm |
| • Racal-Milgo | • Paradyne |
| • Racal-Vadic | • Telebit |

Source: *Computer Intelligence*, March 1991

Agencies are less reluctant to use unfamiliar communications equipment than they are to use unfamiliar computer equipment. Hayes and AT&T communications equipment is popular, yet they only dominate 30% of this market. The rest of the market is filled with smaller companies. Vendors should have no trouble bidding unknown communications equipment if they can show it meets all required specifications.

B

Sales Profiles by Vendor

In this section, INPUT analyzes the sales activity of federal computer equipment vendors by examining FY 1988 to FY 1990 contract awards for ADP equipment, office information systems, and telecommunications equipment.

1. ADP Equipment Top Vendors

INPUT determined the top federal ADP equipment vendors by examining the total value of the contracts awarded to each from FY 1988 to FY 1990. The number and value of the contracts awarded during this time period were reported by each individual government agency. Data deficiencies occur where agencies neglected to report contract awards. These deficiencies are explained where they occur in this section.

The terms "ADP equipment" and "computer equipment" are used synonymously in this section. ADP equipment, as defined by INPUT, includes the following:

- Central processing units (Analog, Digital, and Hybrid)
- Components
- Input/output & storage devices
- Mini & microcomputer control devices
- Punched card equipment
- Supplies
- Support equipment
- System configuration

Exhibit V-14 shows the top 30 ADP equipment vendors for all federal agencies according to the value of the contracts they were awarded from FY 88 to FY 90. The total value of ADP contracts awarded during this time period equaled \$8.1 billion. Seventy percent of these contracts were awarded to the top 30 vendors. Fiscal year 1990 ADP equipment contract awards totaled \$2.6 billion. Seventy-four percent of the FY 90 contracts were awarded to the top 30 federal ADP vendors. The data suggests federal agencies tend to procure a majority of their ADP equipment from the same large companies.

In analyzing the federal computer equipment market, it is useful to compare the data in Exhibit V-1 with that in Exhibit V-14. For example, Exhibit V-14 shows that in the last three years, Unisys has sold more than \$1 billion worth of equipment to the government. There are various possible explanations for this discrepancy:

- As already indicated, no comprehensive inventory of federal computer equipment exists. The surveys identify large representative samples, never the complete list.
- The procurement data depends on accurate data entry, with appropriate Federal Supply Codes (FSCs), by procurement clerical personnel. Since the data is not always accurate, the results may be either misleading or incomplete. As a worst case example, INPUT found that an entire \$62 million DLA award to Grumman was coded as software.
- Finally, in some cases, Unisys may be acting as an integrator, providing different brands of equipment. In these cases, Unisys receives credit for sale but not for the inventory.

Unisys and IBM hold 23% of the federal ADP contracts awarded from FY 1988 to FY 1990. Both IBM and Unisys have a long history in federal contracting and prove to be tough competitors for other system integrators. But with Congressman Conyers' recent assertions that federal agencies show bias toward IBM in their procurements, the market may become easier to penetrate. Also, Unisys' recent financial difficulties may cause agencies to look elsewhere for ADP equipment and services, although this is by no means clear.

EXHIBIT V-14

Top Vendors by ADP Contract Awards—FY 1988-FY 1990

Vendors	Total Awards (\$ Thousands)
Unisys	1,059,809
IBM Corporation	813,528
Digital Equipment Corporation	446,337
Zenith	445,632
Computer Sciences Corporation	304,051
Honeywell	285,345
Wang Laboratories	244,793
Cray Research	213,143
AT&T	172,492
Federal Data Corporation	139,874
Grammtech Maintenance	139,761
GM/EDS/Hughes Aircraft	130,562
Control Data Corporation	128,234
Science Applications International	128,093
C3, Inc.	117,446
Grumman Corporation	105,134
Oracle Corporation	94,441
Hewlett-Packard	88,036
BDM International	79,952
Centel	73,392
Tisoft	59,931
Lockheed	57,375
Intergraph	56,949
SMS Data Products Group	53,085
Vion Corporation	50,979
Eaton	49,801
Silicon Graphics	48,390
Federal Computer Corporation	47,833
Harris Corporation	47,107
Storage Technology	47,001
Total for Top 30 Vendors	5,728,506
Total for All Vendors	8,156,108

Exhibit V-15 shows the relationship between federal expenditures for ADP equipment through pure contracts and bundled contracts. INPUT defines pure contracts as those used to obtain only ADP-related equipment. Bundled contracts contain purchases of ADP equipment combined with other products and services. Bundled contracts may include weapons systems with embedded computers, or contracts to purchase computer equipment along with support services.

Exhibit V-15 shows that the federal ADP expenditures from FY 1988 to FY 90 were evenly split between bundled and pure contracts. Pure ADP equipment contracts totaled \$4.09 billion for this time period, while ADP spending buried in other contracts totaled \$4.07 billion. This observation suggests that integrators may be equally successful in selling ADP equipment through either type of contract.

EXHIBIT V-15

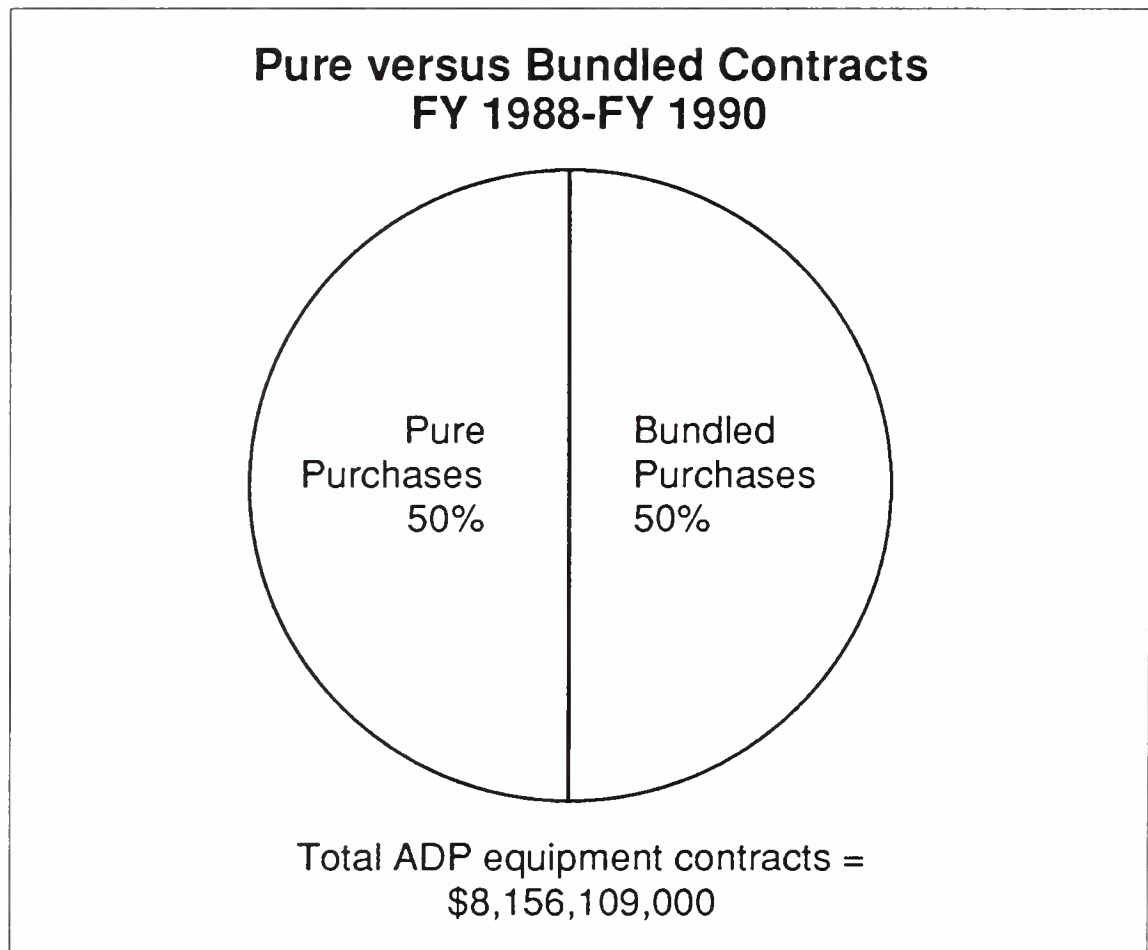
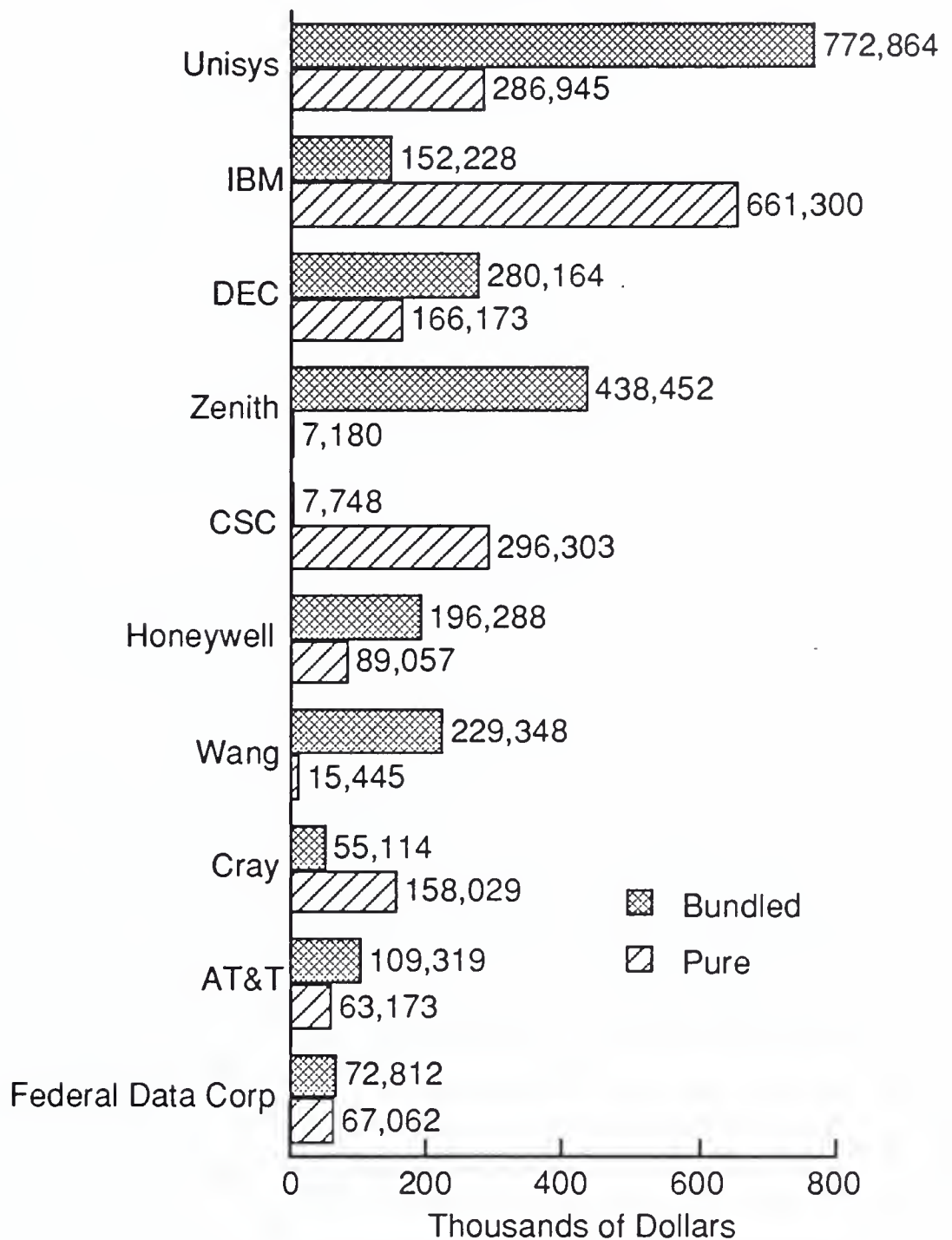


Exhibit V-16 depicts the pure and bundled contract values for the top 10 federal ADP equipment vendors.

IBM, Computer Sciences Corporation, and Cray are the only vendors out of the top 10 integrators whose greatest contract value is derived from pure contracts. The other seven vendors hold mostly bundled ADP contracts. For the top 10 ADP vendors, 56% of the ADP contract dollars were contained in bundled contracts, and 44% were from pure contracts. This may suggest that agencies prefer bundled contracts in order to obtain services or other products to support the ADP equipment they purchase.

EXHIBIT V-16

Pure versus Bundled Contracts for Top Vendors FY 1988-FY 1990



INPUT believes that the bulk of selling under pure contracts comes from indefinite delivery, indefinite quantity (IDIQ) arrangements, and focusing on smaller systems. Agencies often buy large equipment through systems integration arrangements. Federal integrators may make more money by concentrating on bundled contracts, due to the fact that they may charge more for the extra products and services in bundled contracts while gaining an equal amount of money for ADP equipment.

Exhibit V-17 shows the percentage of ADP equipment, in contract dollars, purchased through GSA federal supply schedules and open market contracts. Only 11% of the ADP equipment purchased by federal agencies during FY 88 to FY 90 was bought from a GSA schedule. One explanation for this may be that agencies use GSA schedules to buy smaller equipment and smaller quantities of equipment. Larger, more valuable equipment purchases are competed on the open market. There seems to be more money in contracts competed on the open market, but it also takes more resources for a company to win contracts in this manner. Smaller companies may find subcontracting for large open market bids and setting up a GSA schedule contract are the most cost effective ways for them to do business. GSA schedules are the vehicles of choice for occasional, low unit buys.

EXHIBIT V-17

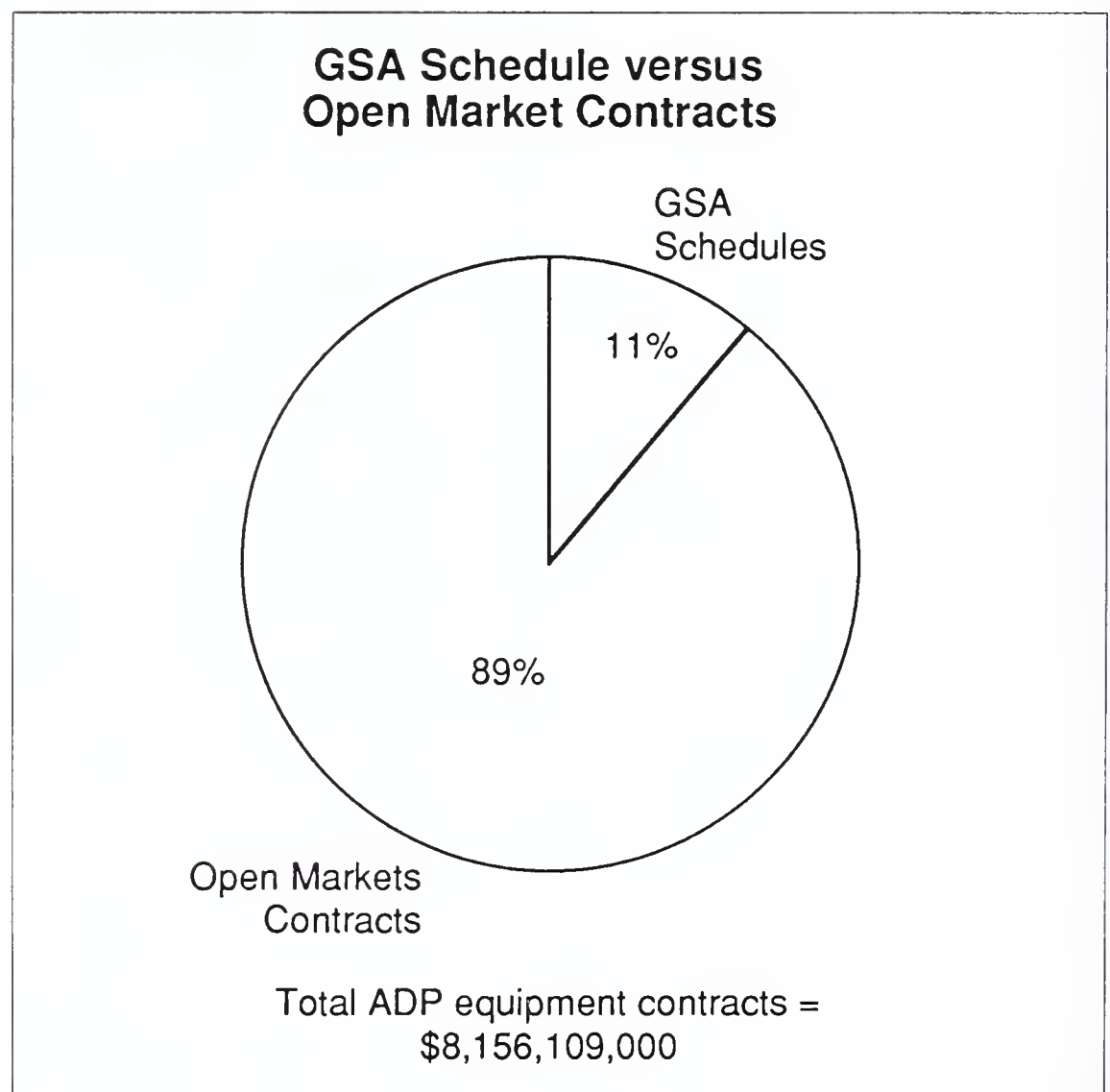


Exhibit V-18 shows the contract value for purchases through GSA schedules and open market contracts for the top ADP vendors. The trend among these large integrators is to concentrate on open market contracts and supplement them with GSA schedule sales.

EXHIBIT V-18

GSA Schedule versus Open Market Contracts FY 1988-FY 1990

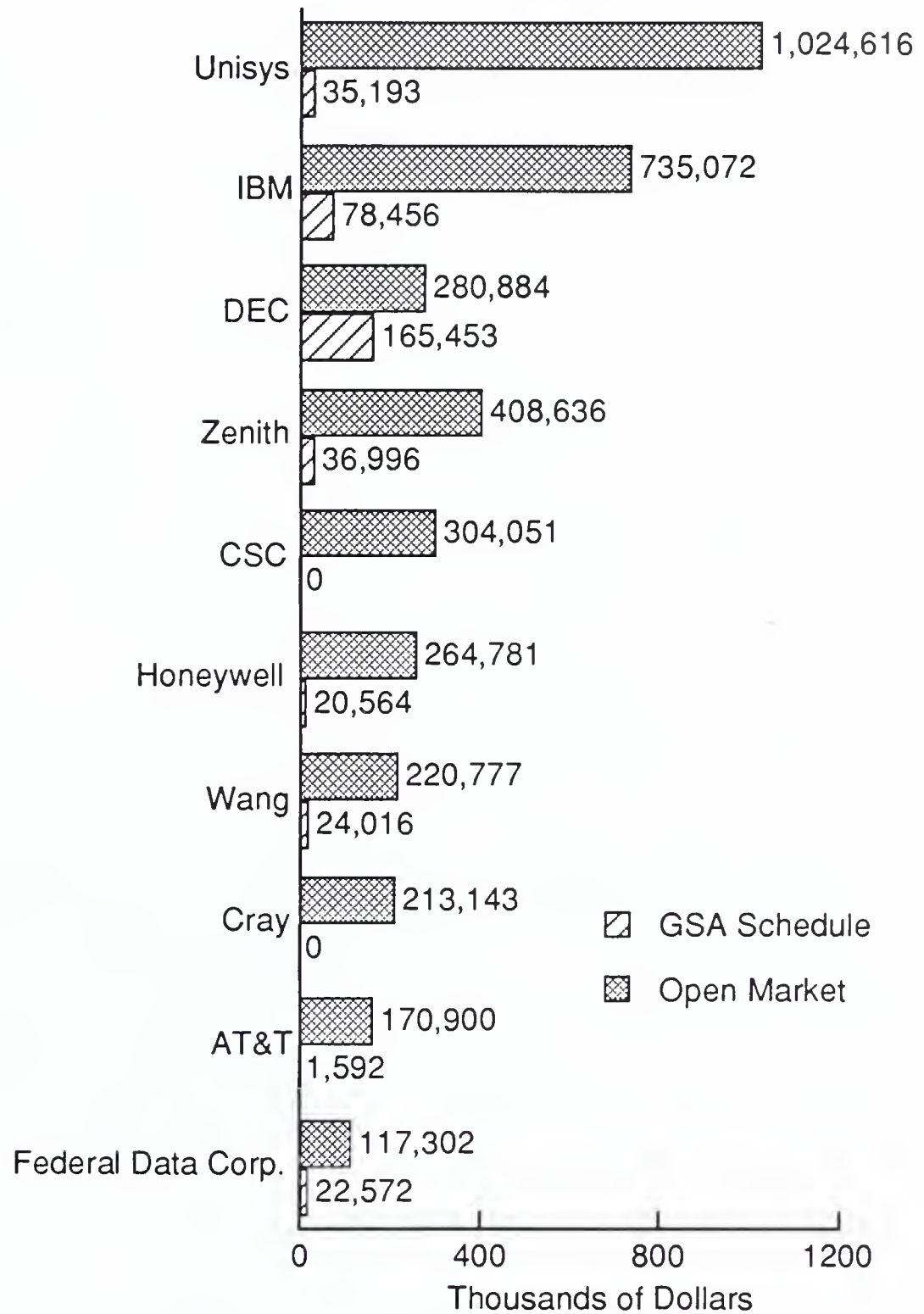


Exhibit V-19 shows the top 10 vendors for the Department of Defense for FY 88 to FY 90. Unisys holds 15% of the DoD contracts awarded in FY 88 through FY 90. Except for Unisys, each DoD vendor holds less than 8% of the contracts awarded in the last three years. This trend suggests that DoD does not favor a certain vendor and name is not a factor in contract awards within DoD. Smaller vendors and lesser known vendors may be successful in DoD contracting. However, in many cases these smaller and lesser known vendors are bidding name brand equipment, especially from IBM.

EXHIBIT V-19

Top Defense Vendors—FY 1988-FY 1990

Vendors	Total Awards (Dollars)
Unisys	788,335
Zenith	444,112
Digital Equipment Corporation	290,718
Honeywell	246,663
IBM	189,808
Computer Sciences Corporation	149,597
Grammtech Maintenance	139,761
Wang Laboratories	119,388
C3, Inc.	114,224
AT&T	110,715
Total for Top 10 Vendors	2,593,321
Total for All DoD Vendors	5,275,356

Exhibit V-20 lists the top 10 civilian vendors for FY 88 to FY 90. Civilian agencies seem to prefer IBM as a vendor judging from the 22% of the contract awards IBM holds from these agencies. IBM proves to be a tough competitor and a strong teammate for open market bids for civilian agencies.

The total value of defense contracts awarded in the past three years is twice that of civilian contracts awarded during the same time period. Due to downsizing in defense departments and agencies, ADP spending among civilian agencies will begin to catch up with past defense spending. ADP contractors can look for defense and civilian spending to become more equal in the next few years.

EXHIBIT V-20

Top Civilian Vendors—FY 1988-FY 1990

Vendors	Total Awards (Dollars)
IBM	623,720
Unisys	271,474
Digital Equipment Corp.	155,619
Computer Sciences Corp.	154,454
Cray Research	136,121
Wang Laboratories	125,405
Federal Data Corp.	71,139
AT&T	61,777
GM/EDS/Hughes Aircraft	59,070
Tisoft	58,434
Total for Top 10 Vendors	1,717,213
Total for Civilian Vendors	2,880,752

Exhibit V-21 lists the top vendors according to contract dollars spent during FY 88 to FY 90 at each of the large federal agencies. Exhibit V-21 also shows the percentage of contracts the vendor holds within that agency.

Initially there appears to be a large amount of favoritism among agencies for specific vendors. Six out of the 19 agencies listed in Exhibit V-21 each awarded over 50% of their contract dollars to one vendor. However, this phenomenon may not be favoritism, but the result of a few large (high dollar value) contract awards to these specific vendors rather than a large number of contracts awarded to the same company.

Systems integrators and federal vendors should be aware of the top vendors within each agency, but should not avoid bidding against these vendors for fear of favoritism. These top vendors are respected within these agencies, but they should be defeatable.

The following agencies did not report any contract awards for FY 90: Health and Human Services, Environmental Protection Agency, and General Services Administration. Because of the insufficient data for these three agencies, their top vendors, listed in Exhibit V-21, may no longer be valid.

EXHIBIT V-21

Top Vendors for Federal Agencies FY 1988-FY 1990

Agency	Vendor	Agency Contracts (Percent)
Navy	Unisys	12
Army	Unisys	25
Air Force	Unisys	15
Agriculture	IBM	25
Commerce	DEC	27
Energy	IBM	21
Health and Human Services	IBM	69
Housing & Urban Development	Unisys	58
Interior	Prime	12
Justice	Tisoft	23
Labor	Unisys	13
State	Wang	81
Transportation	IBM	55
Treasury	CSC	50
Veterans Affairs	DEC	30
Education	Boeing	65
NASA	Cray	31
EPA	Federal Data Corp.	41
GSA	Federal Data Corp.	34

2. Office Information Systems Top Vendors

For purposes of this report, office information systems are not included in ADP equipment contract awards. Office information systems include automated desktop word processing equipment other than personal computers. They do not include adding machines, recording or reproduction equipment, typewriters, or other office machines.

The top 19 vendors for office information systems for FY 88 to FY 90 appear in Exhibit V-22. Statistica (an 8(a) firm) holds 23% of the contract dollars for office information systems awarded from FY 88 to FY 90 derived from only three contracts. Wang holds 18% of these contract dollars from 11 different contracts.

EXHIBIT V-22

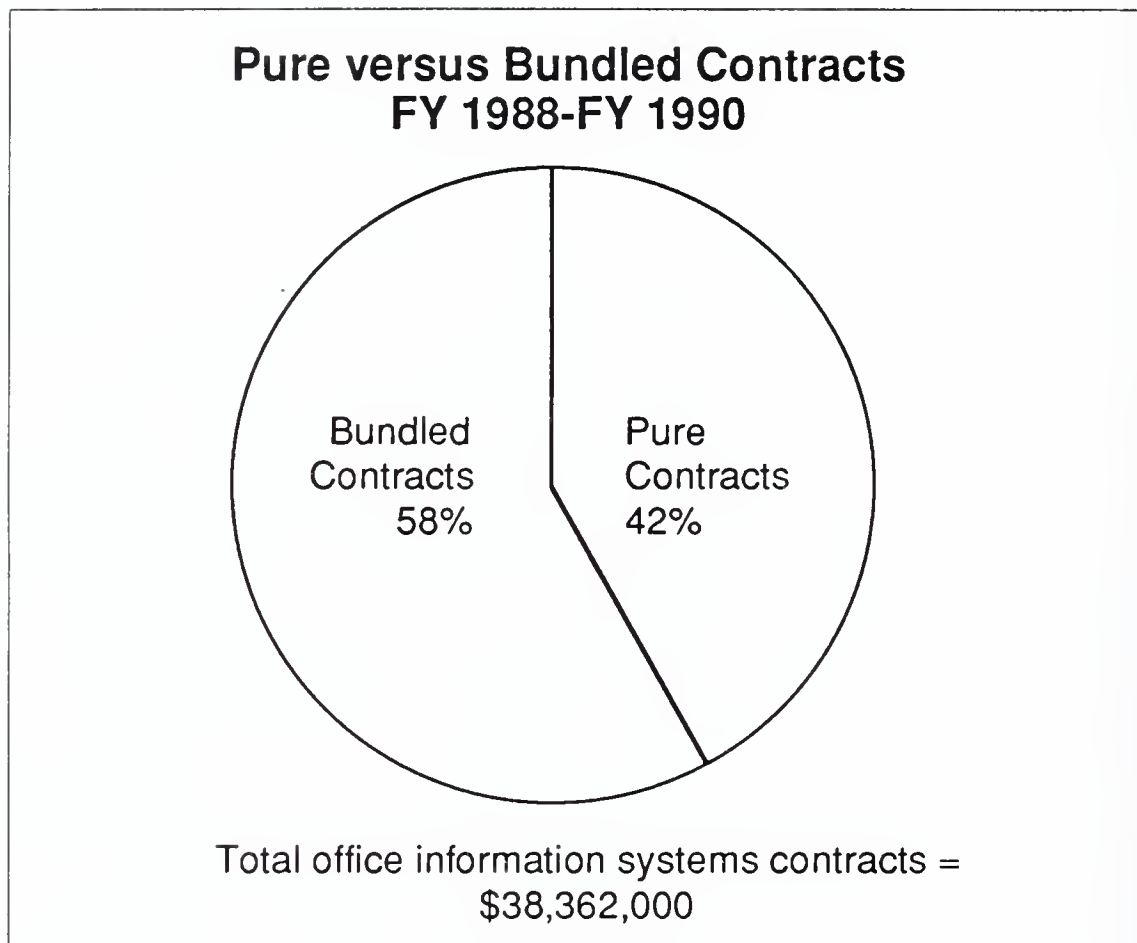
Top Vendors by Office Information Systems Contract Awards, FY 1988-FY 1990

Vendors	Total Awards (Dollars)
Statistica	8,696
Wang Laboratories	6,875
Harris Corp.	3,070
Federal Technology Corp.	2,473
Network Solutions Inc.	1,200
Unisys	1,123
Digital Equipment Corp.	1,111
Perkin-Elmer	1,060
Memorex/Telex	916
CPT Corp.	850
Sterling Federal Systems	790
Washington Data Systems	779
CEXEC	665
IBM	624
Government Technology Systems	587
Federal Data Corp.	582
Dynamac Corp.	561
Xerox	505
Cray Research	465
Total for Top Vendors	32,932
Total for All Vendors	38,362

Statistica seems to specialize in office information systems since they show no ADP contracts, while Wang shows both ADP contracts and office information systems contracts. Integrators may wish to incorporate office information systems equipment into their contract offerings to increase revenue, as Wang has done.

Exhibit V-23 shows the percentage of office information systems sold through pure versus bundled contracts. Office information systems show slightly greater sales through bundled contracts than through pure contracts.

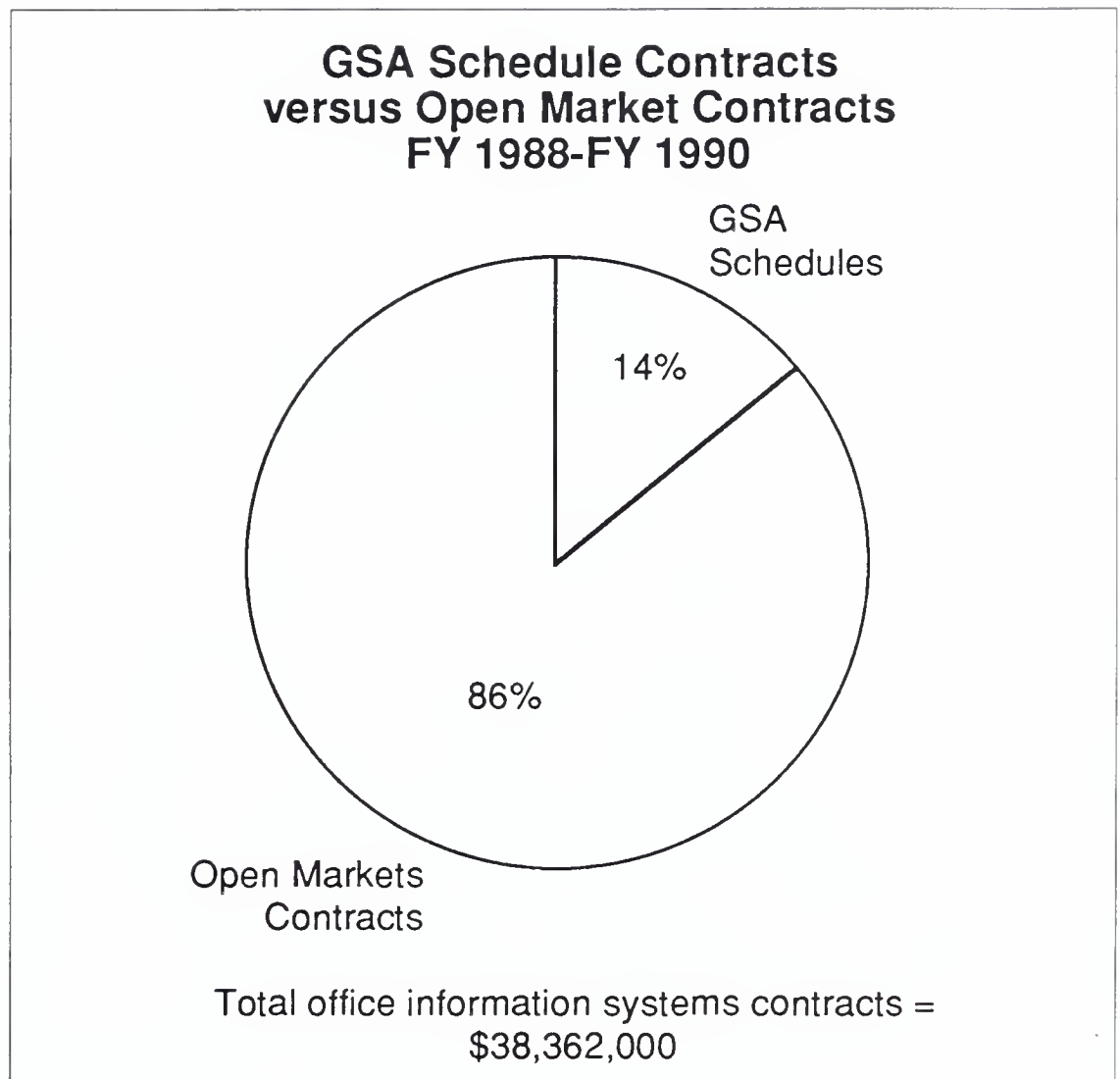
EXHIBIT V-23



Fifty-eight percent of the office information systems sold during FY 1988 to FY 1990 were sold under bundled contracts, while equal amounts of ADP equipment were sold under each type of contract (see Exhibit V-15). These statistics suggest that agencies tend to purchase office information systems in conjunction with other equipment. As suggested earlier, vendors may be able to add office information systems to their ADP equipment proposals to increase the contract value.

Exhibit V-24 shows the percentage of GSA schedule contracts versus open market contracts awarded from FY 88 to FY 90 for office information systems. Only 14% of the office information systems purchased by federal agencies between FY 1988 and FY 1990 were bought from GSA schedule contracts. As with ADP equipment, one explanation for what appears to be limited use of GSA schedules may be that agencies use these schedule contracts to buy smaller quantities of equipment. Larger equipment buys are competed on the open market.

EXHIBIT V-24



GSA schedules are useful for both large and small vendors. Small vendors that have fewer resources and less capacity than large vendors can use GSA schedules to derive a large part of their sales. Larger vendors may find GSA schedule contracts are an excellent supplement to their large open market bids and proposals.

3. Federal Telecommunications Equipment Top Vendors

For purposes of this report, telecommunications equipment includes the following:

- Communication security equipment and components
- Miscellaneous communications equipment
- Cryptologic equipment and components
- Telephone and telegraph equipment
- Teletype and facsimile equipment
- Cable assembly and harnesses
- Cables
- Conductors
- Devices
- Interconnectors

Exhibit V-25 shows the top 10 telecommunications vendors based on contract award value for FY 88 to FY 90. GTE completely dominates the federal telecommunications equipment market with 40% of the total telecommunications contracts awarded from FY 1988 to FY 1990. AT&T, the second-ranking telecommunications vendor, holds only 6% of the contracts for this time period. GTE is the vendor to beat in this market. GTE would also make an attractive teammate.

EXHIBIT V-25

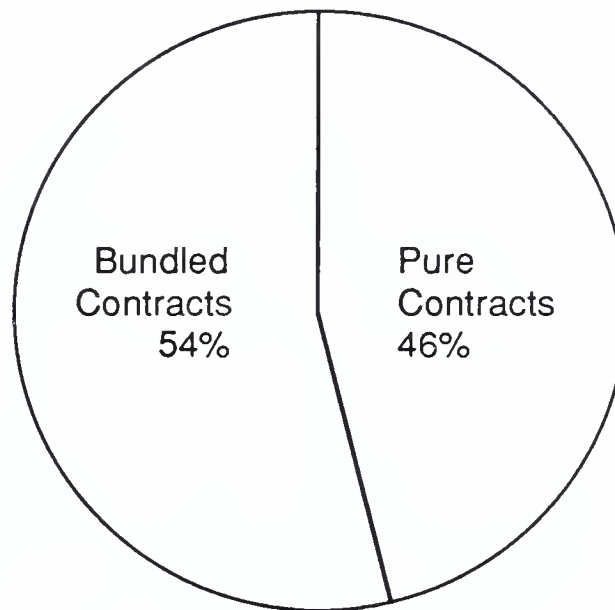
**Top Vendors by Federal Telecommunications
Contract Awards, FY 1988-FY 1990**

Vendors	Total Awards (Dollars)
GTE	3,057,870
AT&T	441,655
IBM	311,312
Harris Corporation	222,667
Loral Corporation	185,733
Control Data Corporation	166,853
Boeing	166,634
GM/EDS/Hughes Aircraft	162,656
E-Systems	137,817
TRW	125,473
Total for Top 10 Vendors	4,978,670
Total for All Vendors	7,574,353

Exhibit V-26 shows the percentage of pure contracts and bundled contracts for telecommunications equipment for FY 88 to FY 90. The relationship between pure and bundled contracts for telecommunications equipment is similar to the contract relationships for office information systems and ADP equipment. There were slightly higher purchases of telecommunications equipment through bundled contracts. As indicated by the pure and bundled contract relationships, agencies prefer to purchase telecommunications equipment bundled with other equipment. However, the percentages for pure and bundled contracts are so similar that vendors will be successful marketing telecommunications equipment in both manners.

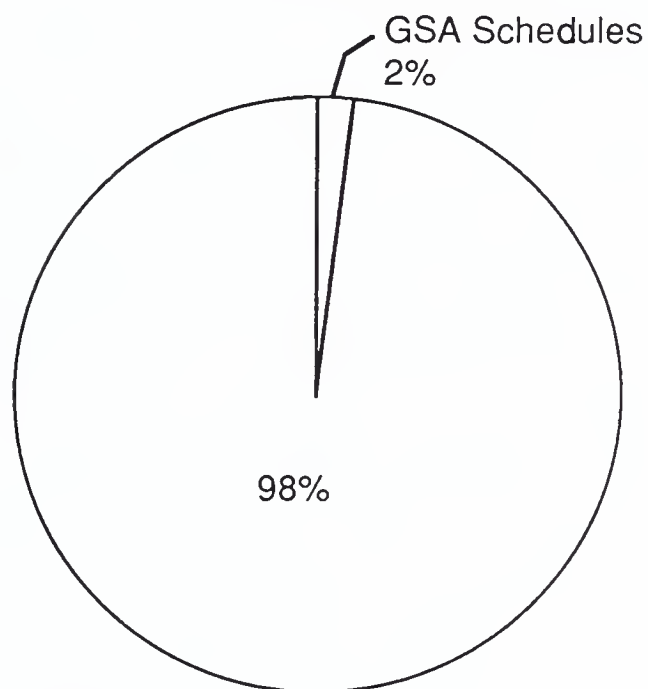
Exhibit V-27 compares GSA schedule contract awards to open market contract awards. Ninety-eight percent of the telecommunications equipment sold to the federal government during FY 88 to FY 90 was competed through the open market. Only 2% of these sales were through GSA contracts.

EXHIBIT V-26

**Pure versus Bundled Contracts
FY 1988-FY 1990**

Total telecommunications contracts =
\$7,547,353,000

EXHIBIT V-27

**GSA Schedule Contracts
versus Open Market Contracts
FY 1988-FY 1990**

Open Markets
Contracts

Total telecommunications contracts =
\$7,547,353,000

Unlike the ADP equipment market and the office information systems market, small vendors will find it difficult to use primarily GSA schedules to sell telecommunications equipment to the federal government. All vendors will need to rely on open market bidding. Smaller vendors will find teaming relationships in this area invaluable.

C

Conclusions and Trends

Total ADP spending fell from FY 88 to FY 89 and rose in FY 90, as shown in Exhibit V-28. The drop in spending for FY 89 may be due to the renewed effort to meet Gramm-Rudman deficit deadlines. The spending increase in FY 90 occurred because of the revised limits set in that year to reduce the budget deficit at a slower rate. ADP spending is predicted to increase in the near future, but at a slower pace than in past years.

EXHIBIT V-28

Total Contract Awards, FY 1988-FY 1990

Market Segment	FY88 (\$)	FY89 (\$)	FY90 (\$)
ADP Equipment	3.1B	2.4B	2.6B
Office Information Systems	17.9M	9.1M	11.3M
Telecomm. Equipment	1.8B	3.4B	2.3M

Office information system spending followed the same pattern as ADP spending, and is also predicted to increase in the near future.

Telecommunications equipment contract awards rose in FY 1989 and dropped in FY 1990. One possible explanation for this pattern may be the effort to network the large volume of ADP equipment purchased in FY 88. Telecommunications contract awards seem to copy ADP equipment awards in one-year intervals. Therefore, in FY 91 telecommunications spending is predicted to increase slightly.

Exhibit V-29 shows defense contract awards over time. Defense spending for ADP equipment and office information systems has been decreasing over the past three years. INPUT expects contract awards for all three market segments to decrease in the future due to defense budget cuts and department downsizing.

EXHIBIT V-29

Total Defense Contract Awards, FY 1988-FY 1990

Market Segment	FY88 (\$)	FY89 (\$)	FY90 (\$)
ADP Equipment	2.1B	1.7B	1.6B
Office Information Systems	10.3M	2.2M	1.9M
Telecomm. Equipment	1.3B	3.1B	2.1B

Exhibit V-30 shows total civilian contract awards for FY 1988 to FY 1990. Civilian ADP and office information system spending followed the same pattern as total spending for both of these market segments, and they are expected to increase in the near future. INPUT recommends that contractors focus their marketing efforts for ADP equipment on civilian agencies.

EXHIBIT V-30

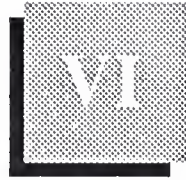
Total Civilian Contract Awards

Market Segment	FY88 (\$)	FY89 (\$)	FY90 (\$)
ADP Equipment	1.1B	767.0M	1.0B
Office Information Systems	7.6M	6.9M	9.5M
Telecomm. Equipment	413.0M	320.0M	289.0M

Unlike total telecommunications contract awards, civilian contract awards for telecommunications have been steadily dropping over the past three years. There appears to be less of a need for telecommunications equipment in civilian agencies than in defense agencies. But as emphasis on defense programs decreases in the next few years, there may be an increased interest in improving civilian information technology, including telecommunications capabilities. INPUT predicts telecommunications spending will remain steady in the next few years and possibly increase.

As discussed earlier, pure and bundled contracts for all three market segments are almost evenly split. Office information systems and telecommunications equipment show slightly more awards through bundled contracts. Contractors should be equally successful in all market segments selling through either pure or bundled contracts. Contractors may prefer bundled contracts because the total contract value is usually higher than that of pure contracts, but the value of the ADP, information system, or telecommunication equipment is virtually the same.

The majority of contracts awarded between FY 1988 and FY 1990 in all three market segments were competed on the open market. GSA schedules counted for less than 15% of total contract awards in each equipment segment. However, all federal equipment purchases valued under \$300,000 must be bought from GSA schedule contracts. GSA schedules are an excellent sales supplement to large firms. They may serve as a main source of income for small companies that do not possess the resources to successfully compete as prime contractors on open market procurements.



Key Opportunities

INPUT LIBRARY

This section describes specific opportunities in the federal computer equipment market. Lists of programs are provided for future computer equipment acquisitions. The list of opportunities consists of programs that are typical of the federal market and serves as a representative sample.

A

Present and Future Program

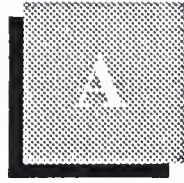
New information technology programs that are larger than \$1 million to \$2 million are listed in at least one of the following federal government documents:

- OMB/GSA Five-Year Plan, which is developed from agency budget requests submitted in compliance with OMB Circular A-11
- Agency long-range information resource plans developed to meet the reporting requirements of the Paperwork Reduction Act of 1980
- Agency annual operating budget requests submitted to both Congressional oversight and appropriations committees based on the OMB A-11 information
- *Commerce Business Daily* for specific opportunities, for qualifications as a bidder, and to obtain a copy of the RFP or RFQ
- Five-Year Defense Plan, which is not publicly available, and the supporting documentation of the separate military departments and agencies
- Classified program documentation available to qualified DoD contractors

B**Federal Computer Equipment Opportunities by Agency**

<u>Program</u>	<u>PAR Number</u>	<u>RFP Schedule</u>	<u>Funding FY91-96 (000s)</u>
Air Force			
Joint Uniform Services Technical Information System	V-1-53	12/01/91	\$600,000
Army			
Worldwide Mini/Microcomputer Support	V-2-57	12/01/91	
Navy			
Shipboard Non-tactical ADP Program	V-3-113	09/01/92	\$151,617
Defense			
Computer-Aided Acquisition and Logistics Support	V-4E-4		
RISC Technology Workstation	V-4H-3		
Commerce			
Patent Application Management System	VI-6-36	10/01/91	
Energy			
Uranium Enrichment Enterprise Computing and Telecommunications	VI-7-99	10/01/92	\$42,385
Health and Human Services			
Turnkey Imaging System	VII-8-47	03/01/92	

<u>Program</u>	<u>PAR Number</u>	<u>RFP Schedule</u>	<u>Funding FY91-96 (000s)</u>
Interior			
Technical Information Management System	VII-9-27		
NASA			
Advanced Parallel Processor	VIII-15-98		\$20,000
Treasury			
Service Center Support System	VII-12-65		\$1,058,332
Series E/EE Savings Bond System	VII-12-69		\$40,541
New Extended Technology	VII-12-75	FY92	\$18,388
Transportation			
Mission-Oriented Information Systems Engineering	VII-11-32	11/01/91	\$40,541
State			
ADPE Modernization	VII-9C-2		\$38,490



Interview Profiles

INPUT LIBRARY

A

Federal Agency Respondent Profile

1. Contact Summary

Contacts with agencies were made by telephone and mail. The majority of the agency interviews were conducted at the departmental level, with officials in the office of Information Resources Management who are responsible for computer systems policy and planning.

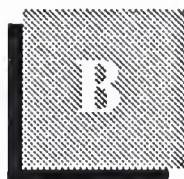
The distribution of job classifications among individual agency respondents for the analysis is as follows:

	Policy	Buyers	Users	Total
Respondents	1	8	20	29

Respondents interviewed represented the agencies listed below, with the number in parentheses indicating the number of different contracts within the agency.

- Department of Defense
 - Air Force (3)
 - Army (4)
 - Navy (2)
- Civilian Agencies
 - Department of Agriculture (4)
 - Department of Commerce (2)
 - Forest Service (1)
 - Department of Energy (3)
 - Department of Justice (2)

- Department of Transportation (1)
- Coast Guard (1)
- Department of Treasury (1)
- Environmental Protection Agency (1)
- General Services Administration (2)
- National Aeronautics and Space Administration (1)
- Veterans Administration (1)



Definition of Terms

A

Introduction

INPUT's *Definition of Terms* provides the framework for all of INPUT's market analyses and forecasts of the information services industry. It is used for all U.S. programs. The structure defined in Exhibit B-1 is also used in Europe and for the worldwide forecast.

One of the strengths of INPUT's market analysis services is the consistency of the underlying market sizing and forecast data. Each year INPUT reviews its industry structure and makes changes if they are required. When changes are made they are carefully documented and the new definitions and forecasts reconciled to the prior definitions and forecasts. INPUT clients have the benefit of being able to track market forecast data from year to year against a proven and consistent foundation of definitions.

The changes made in INPUT definitions this year are as follows:

- *Systems Operations Submodes* - the submodes of systems operations have been redefined from processing services and professional services to platform systems operations and applications systems operations.
- *Business Services Industry* - the industry sectors of business services and personal services have been combined into a single business services sector.
- *Transportation Industry* - the information services expenditures relating to airline reservation systems have been returned to the transportation sector where they resided prior to 1990.

B

Overall Definitions
and Analytical
Framework**1. Information Services**

Information Services are computer/telecommunications-related products and services that are oriented toward the development or use of information systems. Information services typically involve one or more of the following:

- Processing of specific applications using vendor-provided systems (called *Processing Services*)
- A combination of hardware, packaged software and associated support services which will meet a specific application processing need (called *Turnkey Systems*)
- Packaged software products, either systems software or applications software products (called *Software Products*)
- People services that support users in developing and operating their own information systems (called *Professional Services*)
- Bundled combinations of products and services where the vendor assumes total responsibility for the development of a custom solution to an information systems problem (called *Systems Integration*)
- Services that provide operation and management of all or a significant part of a user's information systems functions under a long-term contract (called *Systems Operations*)
- Services associated with the delivery of information in electronic form—typically network-oriented services such as value-added networks, electronic mail and document interchange, on-line data bases, on-line news and data feeds, etc. (called *Network Services*)

In general, the market for information services does not involve providing equipment to users. The exception is where the equipment is bundled as part of an overall service offering such as a turnkey system, a systems operations contract, or a systems integration project.

The information services market also excludes pure data transport services (i.e., data or voice communications circuits). However, where information transport is associated with a network-based service (e.g., EDI or VAN services), or cannot be feasibly separated from other bundled services (e.g., some systems operations contracts), the transport costs are included as part of the services market.

The analytical framework of the information services industry consists of the following interacting factors: overall and industry-specific business environment (trends, events and issues); technology environment; user

information system requirements; size and structure of information services markets; vendors and their products, services and revenues; distribution channels; and competitive issues.

2. Market Forecasts/User Expenditures

All information services market forecasts are estimates of *User Expenditures* for information services. When questions arise about the proper place to count these expenditures, INPUT addresses them from the user's viewpoint: expenditures are categorized according to what users perceive they are buying.

By focusing on user expenditures, INPUT avoids two problems which are related to the distribution channels for various categories of services:

- Double counting, which can occur by estimating total vendor revenues when there is significant reselling within the industry (e.g., software sales to turnkey vendors for repackaging and resale to end users)
- Missed counting, which can occur when sales to end users go through indirect channels such as mail order retailers

Captive Information Services User Expenditures are expenditures for products and services provided by a vendor that is part of the same parent corporation as the user. These expenditures are not included in INPUT forecasts.

Non-captive Information Services User Expenditures are expenditures that go to vendors that have a different parent corporation than the user. It is these expenditures which constitute the information services market analyzed by INPUT and that are included in INPUT forecasts.

3. Delivery Modes

Delivery Modes are defined as specific products and services that satisfy a given user need. While *Market Sectors* specify *who* the buyer is, *Delivery Modes* specify *what* the user is buying.

Of the eight delivery modes defined by INPUT, five are considered primary products or services:

- *Processing Services*
- *Network Services*
- *Professional Services*
- *Applications Software Products*
- *Systems Software Products*

The remaining three delivery modes represent combinations of these products and services, bundled together with equipment, management and/or other services:

- *Turnkey Systems*
- *Systems Operations*
- *Systems Integration*

Section C describes the delivery modes and their structure in more detail.

4. Market Sectors

Market Sectors or markets are groupings or categories of the users who purchase information services. There are three types of user markets:

- *Vertical Industry* markets, such as Banking, Transportation, Utilities, etc. These are called “industry-specific” markets.
- *Functional Application* markets, such as Human Resources, Accounting, etc. These are called “cross-industry” markets.
- *Other* markets, which are neither industry- nor application-specific, such as the market for systems software products and much of the on-line data base market.

Specific market sectors used by INPUT are defined in Section E, below.

5. Other

Outsourcing is defined as the contracting of information systems functions to outside vendors. Outsourcing should be viewed as the opposite of *insourcing*: anything that information systems management has considered feasible to do internally (e.g., data center operations, applications development and maintenance, network management, training, etc.) is a potential candidate for outsourcing.

Information systems has always bought systems software, as it is infeasible for companies to develop it internally. However, all other delivery modes represent functions or products that information systems management could choose to perform or develop in-house. Viewed this way, outsourcing is the result of a make-or-buy decision, and the outsourcing market covers any product or service where the vendor must compete against the client firm’s own internal resources. Therefore, the entire information services industry can be considered an outsourcing market.

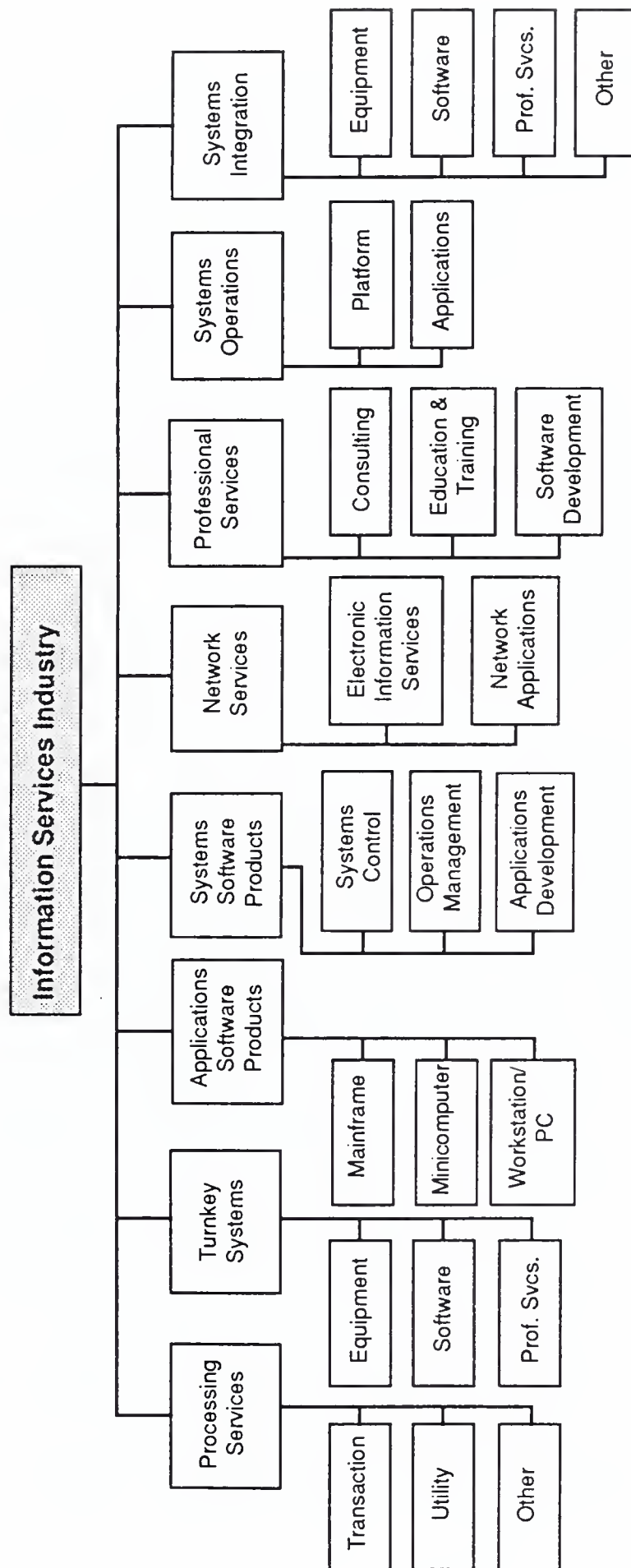
C

Delivery Modes and Submodes

Exhibit B-1 provides the overall structure of the information services industry as defined and used by INPUT. This section of *Definition of Terms* provides definitions for each of the delivery modes and their submodes or components.

EXHIBIT B-1

Information Services Industry Structure—1991



Source: INPUT

1. Software Products

INPUT divides the software products market into two delivery modes: systems software and applications software.

The two delivery modes have many similarities. Both involve user purchases of software packages for in-house computer systems. Included are both lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement or maintain the package at the user's sites. Vendor-provided training or support in operation and use of the package, if bundled in the software pricing, is also included here.

Expenditures for work performed by organizations other than the package vendor are counted in the professional services delivery mode. Fees for work related to education, consulting, and/or custom modification of software products are counted as professional services, provided such fees are charged separately from the price of the software product itself.

a. Systems Software Products

Systems software products enable the computer/communications system to perform basic machine-oriented or user interface functions. INPUT divides systems software products into three submodes.

- *Systems Control Products* - Software programs that function during application program execution to manage computer system resources and control the execution of the application program. These products include operating systems, emulators, network control, library control, windowing, access control, and spoolers.
- *Operations Management Tools* - Software programs used by operations personnel to manage the computer system and/or network resources and personnel more effectively. Included are performance measurement, job accounting, computer operation scheduling, disk management utilities, and capacity management.
- *Applications Development Tools* - Software programs used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Included are traditional programming languages, 4GLs, data dictionaries, data base management systems, report writers, project control systems, CASE systems and other development productivity aids. Also included are system utilities (e.g., sorts) which are directly invoked by an applications program.

INPUT also forecasts the systems software products delivery mode by platform level: mainframe, minicomputer and workstation/PC.

b. Applications Software Products

Applications software products enable a user or group of users to support an operational or administrative process within an organization. Examples include accounts payable, order entry, project management and office systems. INPUT categorizes applications software products into two submodes.

- *Industry-Specific Applications Software Products* - Software products that perform functions related to fulfilling business or organizational needs unique to a specific industry (vertical) market and sold to that market only. Examples include demand deposit accounting, MRPII, medical record keeping, automobile dealer parts inventory, etc.
- *Cross-Industry Applications Software Products* - Software products that perform a specific function that is applicable to a wide range of industry sectors. Examples include payroll and human resource systems, accounting systems, word processing and graphics systems, spreadsheets, etc.

INPUT also forecasts the applications software products delivery mode by platform level: mainframe, minicomputer and workstation/PC.

2. Turnkey Systems

A turnkey system is an integration of equipment (CPU, peripherals, etc.), systems software, and packaged or custom application software into a single product developed to meet a specific set of user requirements. Value added by the turnkey system vendor is primarily in the software and support services provided. Most CAD/CAM systems and many small business systems are turnkey systems. Turnkey systems utilize standard computers and do not include specialized hardware such as word processors, cash registers, process control systems, or embedded computer systems for military applications.

Computer manufacturers (e.g., IBM or DEC) that combine software with their own general-purpose hardware are not classified by INPUT as turnkey vendors. Their software revenues are included in the appropriate software category.

Most turnkey systems are sold through channels known as value-added resellers.

- *Value-Added Reseller (VAR)*: A VAR adds value to computer hardware and/or software and then resells it to an end user. The major value added is usually applications software for a vertical or cross-industry market, but also includes many of the other components of a turnkey systems solution, such as professional services.

Turnkey systems have three components:

- Equipment - computer hardware supplied as part of the turnkey system
- Software products - prepackaged systems and applications software products
- Professional services - services to install or customize the system or train the user, provided as part of the turnkey system sale

3. Processing Services

This delivery mode includes three submodes: transaction processing, utility processing, and “other” processing services.

- *Transaction Processing* - Client uses vendor-provided information systems—including hardware, software and/or data networks—at the vendor site or customer site to process transactions and update client data bases. Transactions may be entered in one of four modes:
 - *Interactive* - Characterized by the interaction of the user with the system for data entry, transaction processing, problem solving and report preparation: the user is on-line to the programs/files stored on the vendor’s system.
 - *Remote Batch* - Where the user transmits batches of transaction data to the vendor’s system, allowing the vendor to schedule job execution according to overall client priorities and resource requirements.
 - *Distributed Services* - Where users maintain portions of an application data base and enter or process some transaction data at their own site, while also being connected through communications networks to the vendor’s central systems for processing other parts of the application.
 - *Carry-in Batch* - Where users physically deliver work to a processing services vendor.
- *Utility Processing* - Vendor provides basic software tools (language compilers, assemblers, DBMSs, graphics packages, mathematical models, scientific library routines, etc.), generic applications programs and/or data bases, enabling clients to develop their own programs or process data on the vendor’s system.
- *Other Processing Services* - Vendor provides service—usually at the vendor site—such as scanning and other data entry services, laser printing, computer output microfilm (COM), CD preparation and other data output services, backup and disaster recovery, etc.

4. Systems Operations

Systems operations was a new delivery mode introduced in the 1990 Market Analysis and Systems Operations programs. It was created by taking the Systems Operations submode out of both Processing Services and Professional Services. For 1991 the submodes have been redefined as indicated below.

Systems operations involves the operation and management of all or a significant part of the user's information systems functions under a long-term contract. These services can be provided in either of two distinct submodes where the difference is whether the support of applications, as well as data center operations, is included.

- *Platform systems operations* - the vendor manages and operates the computer systems, often including telecommunications networks, without taking responsibility for the user's application systems.
- *Applications systems operations* - the vendor manages and operates the computer systems, often including telecommunications networks, and is also responsible for maintaining, or developing and maintaining, the user's application systems.

In the federal government market, systems operation services are also defined by equipment ownership with the terms "COCO" (Contractor-Owned, Contractor-Operated), and "GOCO" (Government-Owned, Contractor-Operated).

The ownership of the equipment, which was the previous basis for the systems operations submodes, is no longer considered critical to the commercial market. Most of the market consists of systems operations relationships using vendor-owned hardware. What is now critical is the breadth of the vendor/client relationship as it expands beyond data center management to applications management.

Systems operations vendors now provide a wide variety of services in support of existing information systems. The vendor can plan, control, provide, operate, maintain and manage any or all components of the user's information systems (equipment, networks, systems and/or application software), either at the client's site or the vendor's site. Systems operations can also be referred to as "resource management" or "facilities management."

5. Systems Integration (SI)

Systems integration is a vendor service that provides a complete solution to an information system, networking or automation requirement through the custom selection and implementation of a variety of information

system products and services. A systems integrator is responsible for the overall management of a systems integration contract and is the single point of contact and responsibility to the buyer for the delivery of the specified system function, on schedule and at the contracted price.

To be included in the information services market, systems integration projects must involve some application processing component. In addition, the majority of cost must be associated with information systems products and/or services.

- *Equipment* - information processing and communications equipment required to build the systems solution. This component may include custom as well as off-the-shelf equipment to meet the unique needs of the project. The systems integration equipment category excludes turnkey systems by definition.
- *Software products* - prepackaged applications and systems software products.
- *Professional services* - the value-added component that adapts the equipment and develops, assembles, or modifies the software and hardware to meet the system's requirements. It includes all of the professional services activities required to develop, and if included in the contract, operate an information system, including consulting, program/project management, design and integration, software development, education and training, documentation, and systems operations and maintenance.
- *Other services* - most systems integration contracts include other services and product expenditures that are not easily classified elsewhere. This category includes miscellaneous items such as engineering services, automation equipment, computer supplies, business support services and supplies, and other items required for a smooth development effort.

Systems integrators perform, or manage others who perform, most or all of the following functions:

- Program management, including subcontractor management
- Needs analysis
- Specification development
- Conceptual and detailed systems design and architecture
- System component selection, modification, integration and customization
- Custom software design and development
- Custom hardware design and development
- Systems implementation, including testing, conversion and post-implementation evaluation and tuning

- Life cycle support, including
 - System documentation and user training
 - Systems operations during development
 - Systems maintenance

6. Professional Services

This category includes three submodes: consulting, education and training, and software development.

- *Consulting*: Services include management consulting (related to information systems), information systems consulting, feasibility analysis and cost-effectiveness studies, and project management assistance. Services may be related to any aspect of the information system, including equipment, software, networks and systems operations.
- *Education and Training*: Products and services related to information systems and services for the professional and end user, including computer-aided instruction, computer-based education, and vendor instruction of user personnel in operations, design, programming, and documentation.
- *Software Development*: Services include user requirements definition, systems design, contract programming, documentation, and implementation of software performed on a custom basis. Conversion and maintenance services are also included.

7. Network Services

Network services typically include a wide variety of network-based functions and operations. Their common thread is that most of these functions could not be performed without network involvement. Network services is divided into two submodes: *Electronic Information Services*, which involve selling information to the user, and *Network Applications*, which involve providing some form of enhanced transport service in support of a user's information processing needs.

a. Electronic Information Services

Electronic information services are data bases that provide specific information via terminal- or computer-based inquiry, including items such as stock prices, legal precedents, economic indicators, periodical literature, medical diagnosis, airline schedules, automobile valuations, etc. The terminals used may be computers themselves, such as communications servers or personal computers. Users typically inquire into and extract information from the data bases. Although users may load extracted data into their own computer systems, the electronic information

vendor provides no data processing or manipulation capability and the users cannot update the vendor's data bases.

The two kinds of electronic information services are:

- *On-line Data Bases* - Structured, primarily numerical data on economic and demographic trends, financial instruments, companies, products, materials, etc.
- *News Services* - Unstructured, primarily textual information on people, companies, events, etc.

While electronic information services have traditionally been delivered via networks, there is a growing trend toward the use of CD ROM optical disks to support or supplant on-line services, and these optical disk-based systems are included in the definition of this delivery mode.

b. Network Applications

Value-Added Network Services (VAN Services) - VAN services are enhanced transport services which involve adding such functions as automatic error detection and correction, protocol conversion, and store-and-forward message switching to the provision of basic network circuits.

While VAN services were originally provided only by specialized VAN carriers (Tymnet, Telenet, etc.), today these services are also offered by traditional common carriers (AT&T, Sprint, etc.). Meanwhile, the VAN carriers have also branched into the traditional common carriers' markets and are offering unenhanced basic network circuits as well.

INPUT's market definition covers VAN services only, but includes the VAN revenues of all types of carriers. The following are examples of VAN services.

- *Electronic Data Interchange (EDI)* - Application-to-application exchange of standardized business documents between trade partners or facilitators. This exchange is commonly performed using VAN services. Specialized translation software is typically employed to convert data from organizations' internal file formats to EDI interchange standards. This software may be provided as part of the VAN service or may be resident on the organization's own computers.
- *Electronic Information Exchange (EIE)* - Also known as electronic mail (E-mail), EIE involves the transmission of messages across an electronic network managed by a services vendor, including facsimile transmission (FAX), voice mail, voice messaging, and access to Telex,

TWX, and other messaging services. This also includes bulletin board services.

- *Other Network Services* - This segment contains videotex and pure network management services. Videotex is actually more a delivery mode than an application. Its prime focus is on the individual as a consumer or in business. These services provide interactive access to data bases and offer the inquirer the ability to send as well as receive information for such purposes as home shopping, home banking, travel reservations, and more.

Network management services included here must involve the vendor's network and network management systems as well as people. People-only services are included in professional services that involve the management of networks as part of the broader task of managing a user's information processing functions are included in systems operations.

D

Sector Definitions

1. Industry Sector Definitions

INPUT has structured the information services market into 15 generic industry sectors, such as process manufacturing, insurance, transportation, etc. The definitions of these sectors are based on the 1987 revision of the Standard Industrial Classification (SIC) Code system. The specific industries (and their SIC Codes) included under these generic industry sectors are detailed in Exhibit B-2.

EXHIBIT B-2

Industry Sector Definitions

Industry Sector	SIC Code	Description
Discrete Manufacturing	23xx	Apparel and other finished products
	25xx	Furniture and fixtures
	27xx	Printing, publishing and allied industries
	31xx	Leather and leather products
	34xx	Fabricated metal products, except machinery and transportation equipment
	35xx	Industrial and commercial machinery and computer equipment
	36xx	Electronic and other electrical equipment and components, except computer equipment
	37xx	Transportation equipment
	38xx	Instruments; photo/med/optical goods; watches/clocks
	39xx	Miscellaneous manufacturing industry
Process Manufacturing	10xx	Metal mining
	12xx	Coal mining
	13xx	Oil and gas extraction
	14xx	Mining/quarrying nonmetallic minerals
	20xx	Food and kindred products
	21xx	Tobacco products
	22xx	Textile mill products
	24xx	Lumber and wood products, except furniture
	26xx	Paper and allied products
	28xx	Chemicals and allied products
	29xx	Petroleum refining and related industries
	30xx	Rubber and miscellaneous plastic products
	32xx	Stone, clay, glass and concrete products
	33xx	Primary metal industries
Transportation Services	40xx	Railroad transport
	41xx	Public transit/transport
	42xx	Motor freight transport/warehousing
	43xx	U.S. Postal Service
	44xx	Water transportation
	45xx	Air transportation (including airline reservation services in 4512)
	46xx	Pipelines, except natural gas
	47xx	Transportation services (including 472x, arrangement of passenger transportation)

EXHIBIT B-2 (CONT.)

Industry Sector Definitions

Industry Sector	SIC Code	Description
Utilities	49xx	Electric, gas and sanitary services
Telecommunications	48xx	Communications
Retail Distribution	52xx 53xx 54xx 55xx 56xx 57xx 58xx 59xx	Building materials General merchandise stores Food stores Automotive dealers, gas stations Apparel and accessory stores Home furniture, furnishings and accessory stores Eating and drinking places Miscellaneous retail
Wholesale Distribution	50xx 51xx	Wholesale trade - durable goods Wholesale trade - nondurable goods
Banking and Finance	60xx 61xx 62xx 67xx	Depository institutions Nondepository institutions Security and commodity brokers, dealers, exchanges and services Holding and other investment offices
Insurance	63xx 64xx	Insurance carriers Insurance agents, brokers and services
Health Services	80xx	Health services
Education	82xx	Educational services

EXHIBIT B-2 (CONT.)

Industry Sector Definitions

Industry Sector	SIC Code	Description
Business Services	65xx	Real estate
	70xx	Hotels, rooming houses, camps, and other lodging places
	72xx	Personal services
	73xx	Business services (except hotel reservation services in 7389)
	7389x	Hotel reservation services
	75xx	Automotive repair, services and parking
	76xx	Miscellaneous repair services
	78xx	Motion pictures
	79xx	Amusement and recreation services
	81xx	Legal services
	83xx	Social services
	84xx	Museums, art galleries, and botanical/zoological gardens
	86xx	Membership organizations
	87xx	Engineering, accounting, research, management, and related services
	89xx	Miscellaneous services
Federal Government	9xxx	
State and Local Government	9xxx	
Miscellaneous Industries	01xx	Agricultural production - crops
	02xx	Agricultural production - livestock/animals
	07xx	Agricultural services
	08xx	Forestry
	09xx	Fishing, hunting and trapping
	15xx	Building construction - general contractors, operative builders
	16xx	Heavy construction - contractors
	17xx	Construction - special trade contractors

2. Cross-Industry Sector Definitions

In addition to these vertical industry sectors, INPUT has identified seven cross-industry or horizontal market sectors. These sectors or markets involve multi-industry applications such as human resource systems, accounting systems, etc. In order to be included in an industry sector, the service or product delivered must be specific to that sector only. If a service or product is used in more than one industry sector, it is counted as cross-industry. The seven cross-industry markets are:

Accounting - consists of applications software products and information services that serve such functions as:

- General ledger
 - Accounts payable
 - Accounts receivable
 - Billing/invoicing
 - Fixed assets
 - International accounting
 - Purchasing
 - Taxation
 - Financial consolidation
- Excluded are accounting products and services directed to a specific industry, such as tax processing services for CPAs and accountants within the business services industry sector.

Human Resources - consists of application solutions purchased by multiple industry sectors to serve the functions of human resources management and payroll. Examples of specific applications within these two major functions are:

- Employee relations
- Benefits administration
- Government compliance
- Manpower planning
- Compensation administration
- Applicant tracking
- Position control
- Payroll processing

Education and Training - consists of education and training for information systems professionals and users of information systems, as well as the use of computer-based training tools for the training of any employee on any subject.

- The education and training cross-industry sector only considers education and training offered for a noncaptive market; in other words, this sector does not include educational services provided by information services vendors to their customers for training on their own products.
- Education and training that is provided in a classroom setting, live, is not included in this cross-industry sector. This sector is not to be confused with the education industry-specific sector, the subject of another MAP report, which addresses primary and secondary education as a vertical market for IS services.

Office Systems consists of the following:

- Integrated office systems (IOS)
- Word processing
- Desktop publishing
- Graphics
- IOSs—such as IBM's OfficeVision, HP's NewWave Office and DEC's All-In-1—typically include the following core functions, all of which are accessed from the same desktop: electronic mail, decision support systems, time management and filing systems.
- Office systems graphics include presentation graphics (which represent the bulk of office systems graphics), paint and line art, page description languages, and electronic form programs.

Engineering and Scientific encompasses the following applications:

- Computer-aided design and engineering (CAD and CAE)
- Structural analysis
- Statistics/mathematics/operations research
- Mapping
- Computer-aided manufacturing (CAM) or CAD that is integrated with CAM is excluded from the cross-industry sector as it is specific to the manufacturing industries. CAD or CAE that is dedicated to integrated circuit design is also excluded because it is specific to the semiconductor industry.

Planning and Analysis consists of software products and information services in four application areas:

- Executive Information Systems (EIS)
- Financial modeling or planning systems
- Spreadsheets
- Project management

Other encompasses marketing/sales and electronic publishing application solutions.

- Sales and marketing includes:
 - Sales analysis
 - Marketing management
 - Demographic market planning models
- The fundamental difference between electronic publishing and desktop publishing (within the office systems sector) is that electronic publishing encompasses a method of document management and control from a single point—regardless of how many authors/locations work on a document—whereas desktop publishing is a personal productivity tool and is generally a lower end product residing on a personal computer.
- Electronic or computer publishing systems that are sold strictly and specifically to commercial publishers, printers, and typesetters are excluded from cross-industry consideration and are included in the discrete manufacturing industry.

3. Delivery Mode Reporting by Sector

This section describes how the delivery mode forecasts relate to the market sector forecasts. Exhibit B-3 summarizes the relationships.

- *Processing services* - the transaction processing services submode is forecasted for each industry and cross-industry market sector. The utility and other processing services submodes are not considered industry or cross-industry specific and are only forecasted for the total market.
- *Turnkey systems* - all of the turnkey systems delivery mode is considered either industry or cross-industry specific and is forecasted for the 15 industry and 7 cross-industry sectors. Each component of turnkey systems (equipment, software products and professional services) is forecasted by market sector.
- *Applications software products* - all of the applications software products delivery mode is considered either industry or cross-industry specific and is forecasted for the 15 industry and 7 cross-industry sectors. In addition, each forecast is broken down by platform level: mainframe, minicomputer and workstation/PC.
- *Systems operations* - all of systems operations is considered industry specific. Each of the submodes (platform and applications systems operations) is forecasted for each of the 15 industry sectors.

EXHIBIT B-3

Delivery Mode versus Market Sector Forecast Content

Delivery Mode	Submode	Market Sectors		
		Industry Sectors	Cross-Industry Sectors	Other
Processing Services	Transaction Utility Other	X	X	X X
Turnkey Systems		X	X	
Applications Software Products		X	X	
Systems Operations	Platform Applications	X X		
Systems Integration		X		
Professional Services		X		
Network Services	Network Applications Electronic Information Services	X X		X
Systems Software Products				X

- *Systems integration* - all of systems integration is considered industry specific. Each of the components of systems integration (equipment, software products, professional services and other services) is forecasted for each of the 15 industry sectors.
- *Professional services* - all of professional services is considered industry specific. Each of the submodes (consulting, education and training, and software development) is forecasted for each of the 15 industry sectors.
- *Network services* - all of the network applications submode of network services is considered industry specific and is forecasted for each of the 15 industry sectors. The electronic information services submode is considered to have both industry-specific and non-specific elements.

The forecast for electronic information systems includes forecasts for the 15 industry sectors as well as an additional forecast component that applies to the market as a whole.

- *Systems software products* - All of the submodes (systems control, operations management, applications development) are considered neither industry- nor cross-industry specific. They are only forecasted in total. In addition, each submode forecast is broken down by platform level: mainframe, minicomputer and workstation/PC.

E

Vendor Revenue and User Expenditure Conversion

The size of the information services market may be viewed from two perspectives: vendor (producer) revenues and user expenditures. While the primary data for INPUT's research is vendor interviews, INPUT defines and forecasts the information services market in terms of end-user expenditures. End-user expenditures reflect the markup in producer sales when a product such as software is delivered through indirect distribution channels (such as original equipment manufacturers (OEMs), retailers and distributors). The focus on end-user expenditure also eliminates the double counting of revenues that would occur if sales were tabulated for both producer (e.g., Lotus) and distributor (e.g., BusinessLand).

For most delivery modes, vendor revenues and user expenditures are fairly close. However, there are some areas of significant difference. Many microcomputer software products, for example, are marketed through indirect distribution channels. To capture the value added through these indirect distribution channels, adjustment factors that incorporate industry discount ratios are used to convert estimated information services vendor revenues to end-user expenditures.

For some delivery modes, including software products, systems integration and turnkey systems, there is a significant volume of intra-industry sales. For example, systems integrators purchase software and subcontract the services of other professional services vendors. And turnkey vendors incorporate purchased software into the systems they sell to end users.

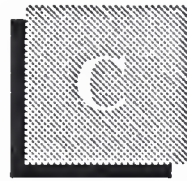
To account for such intra-industry transactions, INPUT uses other conversion ratios to derive the estimate of end-user expenditures.

Exhibit B-4 summarizes the net effect of the various ratios used by INPUT to convert vendor revenues to end-user expenditure (market size) figures for each delivery mode.

EXHIBIT B-4

**Vendor Revenue to
User Expenditure Conversion**

Delivery Mode	Vendor Revenue Multiplier
Applications Software Products	1.18
Systems Software Products	1.10
Systems Operations	1.00
Systems Integration	0.99
Professional Services	0.99
Network Services	0.99
Processing Services	0.99
Turnkey Systems	0.95



Glossary of Federal Acronyms

The federal government's procurement language uses a combination of acronyms, phrases, and words that is complicated by different agency definitions and interpretations. The government also uses terms of accounting, business, economics, engineering, and law with new applications and technology.

Acronyms and contract terms that INPUT encountered most often in program documentation and interviews for this report are included here, but this glossary should not be considered all-inclusive. Federal procurement regulations (DAR, FPR, FAR, FIRMR, FPMR) and contract terms listed in RFIs, RFPs, and RFQs provide applicable terms and definitions.

Federal agency acronyms have been included to the extent they are employed in this report.

A

Federal Acronyms

AAS	Automatic Addressing System.
AATMS	Advanced Air Traffic Management System.
ACO	Administrative Contracting Offices (DCAS).
ACS	Advanced Communications Satellite (formerly NASA 30/20 GHz Satellite Program).
ACT-1	Advanced Computer Techniques (Air Force).
Ada	DoD High-Order Language.
ADA	Airborne Data Acquisition.
ADL	Authorized Data List.
ADS	Automatic Digital Switches (DCS).
AFA	Air Force Association.
AFCEA	Armed Forces Communications Electronics Association.
AGE	Aerospace Ground Equipment.
AIP	Array Information Processing.

AIS	Automated Information System
AMPE	Automated Message Processing Equipment.
AMPS	Automated Message Processing System.
AMSL	Acquisition Management Systems List.
ANG	Army National Guard
AP(P)	Advance Procurement Plan.
Appropriation	Congressionally approved funding for authorized programs and activities of the Executive Branch.
APR	Agency Procurement Request.
ARPANET	DARPA network of scientific computers.
ASP	Aggregated Switch Procurement
ATLAS	Abbreviated Test Language for All Systems (for ATE-Automated Test Equipment).
Authorization	In the legislative process programs, staffing, and other routine activities must be approved by Oversight Committees before the Appropriations Committee will approve the money from the budget.
AUSA	Association of the U.S. Army.
AUTODIN	AUTOMATIC DIGITAL Network of the Defense Communications System.
AUTOSEVOCOM	AUTOMATIC SECURE VOICE COMMUNICATIONS Network
AUTOVON	AUTOMATIC VOICE Network of the Defense Communications System.
BA	Basic Agreement.
BAFO	Best And Final Offer.
Base level	Procurement, purchasing, and contracting at the military installation level.
BCA	Board of Contract Appeals.
Benchmark	Method of evaluating ability of a candidate computer system to meet user requirements.
Bid protest	Objection (in writing, before or after contract award) to some aspect of a solicitation by a valid bidder.
BML	Bidders Mailing List - qualified vendor information filed annually with federal agencies to automatically receive RFPs and RFQs in areas of claimed competence.
BOA	Basic Ordering Agreement.
B&P	Bid and Proposal - vendor activities in response to government solicitation/specific overhead allowance.
BPA	Blanked Purchase Agreement.
Budget	Federal Budget, proposed by the President and subject to Congressional review.
C ²	Command and Control.
C ³	Command, Control, and Communications.
C ⁴	Command, Control, Communications, and Computers.
C ³ I	Command, Control, Communications, and Intelligence.
CAB	Contract Adjustment Board or Contract Appeals Board.
CADE	Computer-Aided Design and Engineering.
CADS	Computer-Assisted Display Systems.
CAIS	Computer-Assisted Instruction System.
CALS	Computer-Aided Automated Logistic System
CAPS	Command Automation Procurement Systems.

CAS	Contract Administration Services or Cost Accounting Standards.
CASB	Cost Accounting Standards Board.
CASP	Computer-Assisted Search Planning.
CBD	Commerce Business Daily - U.S. Department of Commerce publication listing government contract opportunities and awards.
CBO	Congressional Budget Office.
CCEP	Commercial Comsec Endorsement Program
CCDR	Contractor Cost Data Reporting.
CCN	Contract Change Notice.
CCPDS	Command Center Processing and Display Systems.
CCPO	Central Civilian Personnel Office.
CCTC	Command and Control Technical Center (JCS).
CDR	Critical Design Review.
CDRL	Contractor Data Requirement List.
CFE	Contractor-Furnished Equipment.
CFR	Code of Federal Regulations.
CICA	Competition in Contracting Act
CIG	Computerized Interactive Graphics.
CIR	Cost Information Reports.
CM	Configuration Management.
CMI	Computer-Managed Instruction.
CNI	Communications, Navigation, and Identification.
CO	Contracting Office, Contract Offices, or Change Order.
COC	Certificate of Competency (administered by the Small Business Administration).
COCO	Contractor-Owned, Contractor-Operated.
CODSIA	Council of Defense and Space Industry Associations.
COMSTAT	Communications Satellite Corporation.
CONUS	CONtinental United States.
COP	Capability Objective Package.
COTR	Contracting Officer's Technical Representative.
CP	Communications Processor.
CPAF	Cost-Plus-Award-Fee Contract.
CPFF	Cost-Plus-Fixed-Fee Contract.
CPIF	Cost-Plus-Incentive-Fee Contract.
CPR	Cost Performance Reports.
CPSR	Contractor Procurement System Review.
CR	Cost Reimbursement (Cost Plus Contract).
CSA	Combat or Computer Systems Architecture.
C/SCSC	Cost/Schedule Control System Criteria (also called "C-Spec").
CWAS	Contractor Weighted Average Share in Cost Risk.
DAL	Data Accession List.
DAR	Defense Acquisition Regulations.
DARPA	Defense Advanced Research Projects Agency.
DAS	Data Acquisition System.
DBHS	Data Base Handling System.
DCA	Defense Communications Agency.

DCAA	Defense Contract Audit Agency.
DCAS	Defense Contract Administration Services.
DCASR	DCAS Region.
DCC	Digital Control Computer.
DCP	Development Concept Paper (DoD).
DCS	Defense Communications System.
DCTN	Defense Commercial Telecommunications Network.
DDA	Dynamic Demand Assessment (Delta Modulation).
DDC	Defense Documentation Center.
DDL	Digital Data Link - A segment of a communications network used for data transmission in digital form.
DDN	Defense Data Network.
DDS	Dynamic Diagnostics System.
DECCO	DEfense Commercial Communications Office.
DECEO	DEfense Communications Engineering Office.
D&F	Determination and Findings - required documentation for approval of a negotiated procurement.
DIA	Defense Intelligence Agency.
DIF	Document Interchange Format, Navy-sponsored word processing standard.
DHHS	Department of Health and Human Services.
DIDS	Defense Integrated Data Systems.
DISC	Defense Industrial Supply Center.
DLA	Defense Logistics Agency.
DMA	Defense Mapping Agency.
DNA	Defense Nuclear Agency.
DO	Delivery Order.
DOA	Department of Agriculture (also USDA).
DOC	Department of Commerce.
DOE	Department of Energy.
DOI	Department of Interior.
DOJ	Department of Justice.
DOS	Department of State.
DOT	Department of Transportation.
DPA	Delegation of Procurement Authority (granted by GSA under FPRs).
DPC	Defense Procurement Circular.
DQ	Definite Quantity Contract.
DQ/PL	Definite Quantity Price List Contract.
DR	Deficiency Report.
DSCS	Defense Satellite Communication System.
DSN	Defense Switched Network.
DSP	Defense Support Program (WWMCCS).
DSS	Defense Supply Service.
DTC	Design-To-Cost.
ECP	Engineering Change Proposal.
ED	Department of Education.
EEO	Equal Employment Opportunity.
8(a) Set-Aside	Agency awards direct to Small Business Administration for direct placement with a socially/economically disadvantaged company.

EMC	Electro-Magnetic Compatibility.
EMCS	Energy Monitoring and Control System.
EO	Executive Order - Order issued by the President.
EOQ	Economic Ordering Quantity.
EPA	Economic Price Adjustment.
EPA	Environmental Protection Agency.
EPMR	Estimated Peak Monthly Requirement.
EPS	Emergency Procurement Service (GSA) or Emergency Power System.
EUC	End User Computing, especially in DoD.
FA	Formal Advertising.
FAC	Facility Contract.
FAR	Federal Acquisition Regulations.
FCA	Functional Configuration Audit.
FCC	Federal Communications Commission.
FCDC	Federal Contract Data Center.
FCRC	Federal Contract Research Center.
FDPC	Federal Data Processing Center.
FEDSIM	Federal (Computer) Simulation Center (GSA).
FEMA	Federal Emergency Management Agency.
FFP	Firm Fixed-Price Contract (also Lump Sum Contract).
FIPS	NBS Federal Information Processing Standard.
FIPS PUBS	FIPS Publications.
FIRMR	Federal Information Resource Management Regulations.
FMS	Foreign Military Sales.
FOC	Final Operating Capability.
FOIA	Freedom of Information Act.
FP	Fixed-Price Contract.
FP-L/H	Fixed-Price - Labor/Hour Contract.
FP-LOE	Fixed-Price - Level-Of-Effort Contract.
FPMR	Federal Property Management Regulations.
FPR	Federal Procurement Regulations.
FSC	Federal Supply Classification.
FSG	Federal Supply Group.
FSN	Federal Supply Number.
FSS	Federal Supply Schedule or Federal Supply Service (GSA).
FSTS	Federal Secure Telecommunications System.
FT Fund	A revolving fund, designated as the Federal Telecommunications Fund, used by GSA to pay for GSA-provided common-user services, specifically including the current FTS and proposed FTS 2000 services.
FTSP	Federal Telecommunications Standards Program administered by NCS; Standards are published by GSA.
FTS	Federal Telecommunications System.
FTS 2000	Proposed replacement for the Federal Telecommunications System.
FY	Fiscal Year.
FYDP	Five-Year Defense Plan.
GAO	General Accounting Office.
GFE	Government-Furnished Equipment.

GFM	Government-Furnished Material.
GFY	Government Fiscal Year (October to September).
GIDEP	Government-Industry Data Exchange Program.
GOCO	Government Owned - Contractor Operated.
GOGO	Government Owned - Government Operated.
GOSIP	Government Open Systems Interconnection Profile.
GPO	Government Printing Office.
GPS	Global Positioning System.
GRH	Gramm-Rudman-Hollings Act (1985), also called Gramm-Rudman Deficit Control.
GS	General Schedule.
GSA	General Services Administration.
GSBCA	General Services Administration Board of Contract Appeals.
HCFA	Health Care Financing Administration.
HHS	(Department of) Health and Human Services.
HPA	Head of Procuring Activity.
HSDP	High-Speed Data Processors.
HUD	(Department of) Housing and Urban Development.
ICA	Independent Cost Analysis.
ICAM	Integrated Computer-Aided Manufacturing.
ICE	Independent Cost Estimate.
ICP	Inventory Control Point.
ICST	Institute for Computer Sciences and Technology, National Bureau of Standards, Department of Commerce.
IDAMS	Image Display And Manipulation System.
IDEP	Interservice Data Exchange Program.
IDN	Integrated Data Network.
IFB	Invitation For Bids.
IOC	Initial Operating Capability.
IOI	Internal Operating Instructions.
IPS	Integrated Procurement System.
IQ	Indefinite Quantity Contract.
IR&D	Independent Research & Development.
IRM	Information Resources Management.
IXS	Information Exchange System.
JFMIP	Joint Financial Management Improvement Program.
JOCIT	Jovial Compiler Implementation Tool.
JSIPS	Joint Systems Integration Planning Staff.
JSOP	Joint Strategic Objectives Plan.
JSOR	Joint Service Operational Requirement.
JUMPS	Joint Uniform Military Pay System.
LC	Letter Contract.
LCC	Life Cycle Costing.
LCMP	Life Cycle Management Procedures (DD7920.1).

LCMS	Life Cycle Management System.
L-H	Labor-Hour Contract.
LOI	Letter of Interest.
LRPE	Long-Range Procurement Estimate.
LRIRP	Long-Range Information Resource Plan.
MAISRC	Major Automated Information Systems Review Council (DoD).
MANTECH	MANufacturing TECHnology.
MAPS	Multiple Address Processing System.
MAP/TOP	Manufacturing Automation Protocol/Technical and Office Protocol.
MASC	Multiple Award Schedule Contract.
MDA	Multiplexed Data Accumulator.
MENS	Mission Element Need Statement or Mission Essential Need Statement (see DD-5000.1 Major Systems Acquisition).
MILSCAP	Military Standard Contract Administration Procedures.
MIL SPEC	Military Specification.
MIL STD	Military Standard.
MIPR	Military Interdepartmental Purchase Request.
MOD	Modification.
MOL	Maximum Ordering Limit (Federal Supply Service).
MPC	Military Procurement Code.
MYP	Multi-Year Procurement.
NARDIC	Navy Research and Development Information Center.
NASA	National Aeronautics and Space Administration.
NBS	National Bureau of Standards.
NCMA	National Contract Management Association.
NCS	National Communications System; responsible for setting U.S. Government standards administered by GSA; also holds primary responsibility for emergency communications planning.
NICRAD	Navy-Industry Cooperative Research and Development.
NIP	Notice of Intent to Purchase.
NMCS	National Military Command System.
NSA	National Security Agency.
NSEP	National Security and Emergency Preparedness.
NSF	National Science Foundation.
NSIA	National Security Industrial Association.
NTIA	National Telecommunications and Information Administration of the Department of Commerce; replaced the Office of Telecommunications Policy in 1970 as planner and coordinator for government communications programs; primarily responsible for radio.
NTIS	National Technical Information Service.
Obligation	"Earmarking" of specific funding for a contract from committed agency funds.
OCS	Office of Contract Settlement.
OFCC	Office of Federal Contract Compliance.
Off-Site	Services to be provided near but not in government facilities.
OFMP	Office of Federal Management Policy (GSA).

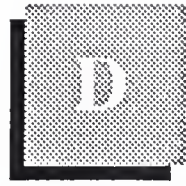
OFPP	Office of Federal Procurement Policy.
OIRM	Office of Information Resources Management.
O&M	Operations & Maintenance.
OMB	Office of Management and Budget.
O,M&R	Operations, Maintenance, and Readiness.
On-Site	Services to be performed on a government installation or in a specified building.
OPM	Office of Procurement Management (GSA) or Office of Personnel Management.
Options	Sole-source additions to the base contract for services or goods to be exercised at the government's discretion.
OSHA	Occupational Safety and Health Act.
OSI	Open System Interconnect.
OSP	Offshore Procurement.
OTA	Office of Technology Assessment (Congress).
Out-Year	Proposed funding for fiscal years beyond the Budget Year (next fiscal year).
P-I	FY Defense Production Budget.
P3I	Pre-Planned Product Improvement (program in DoD).
PAR	Procurement Authorization Request or Procurement Action Report.
PAS	Pre-Award Survey.
PASS	Procurement Automated Source System.
PCO	Procurement Contracting Officer.
PDA	Principal Development Agency.
PDM	Program Decision Memorandum.
PDR	Preliminary Design Review.
PIR	Procurement Information Reporting.
PME	Performance Monitoring Equipment.
PMP	Purchase Management Plan.
PO	Purchase Order or Program Office.
POM	Program Objective Memorandum.
POSIX	Portable Open System Interconnection Exchange.
POTS	Purchase of Telephone Systems.
PPBS	Planning, Programming, Budgeting System.
PR	Purchase Request or Procurement Requisition.
PRA	Paperwork Reduction Act.
PS	Performance Specification - alternative to a Statement of Work, when work to be performed can be clearly specified.
QA	Quality Assurance.
QAO	Quality Assurance Office.
QMCS	Quality Monitoring and Control System (DoD software).
QMR	Qualitative Material Requirement (Army).
QPL	Qualified Products List.
QRC	Quick Reaction Capability.
QRI	Quick Reaction Inquiry.
R-I	FY Defense RDT&E Budget.
RAM	Reliability, Availability, and Maintainability.
RC	Requirements Contract.

R&D	Research and Development.
RDA	Research, Development, and Acquisition.
RDD	Required Delivery Date.
RD&E	Research, Development, and Engineering.
RDF	Rapid Deployment Force.
RDT&E	Research, Development, Test, and Engineering.
RFI	Request For Information.
RFP	Request For Proposal.
RFQ	Request For Quotation.
RFTP	Request For Technical Proposals (Two-Step).
ROC	Required Operational Capability.
ROI	Return On Investment.
RTAS	Real Time Analysis System.
RTDS	Real Time Display System.
SA	Supplemental Agreement.
SBA	Small Business Administration.
SB Set-Aside	Small Business Set-Aside contract opportunities with bidders limited to certified small businesses.
SCA	Service Contract Act (1964 as amended).
SCN	Specification Change Notice.
SDN	Secure Data Network.
SEC	Securities and Exchange Commission.
SE&I	Systems Engineering and Integration.
SETA	Systems Engineering/Technical Assistance.
SETS	Systems Engineering/Technical Support.
SIBAC	Simplified Intragovernmental Billing and Collection System.
SIMP	Systems Integration Master Plan.
SIOP	Single Integrated Operations Plan.
SNAP	Shipboard Nontactical ADP Program.
Sole Source	Contract award without competition.
Solicitation	Invitation to submit a bid.
SOR	Specific Operational Requirement.
SOW	Statement of Work.
SSA	Source Selection Authority (DoD).
SSAC	Source Selection Advisory Council.
SSEB	Source Selection Evaluation Board.
SSO	Source Selection Official (NASA).
STINFO	Scientific and Technical INFOrmation Program - Air Force/NASA.
STU	Secure Telephone Unit.
SWO	Stop-Work Order.
Synopsis	Brief Description of contract opportunity in CBD after D&F and before release of solicitation.
TA/AS	Technical Assistance/Analysis Services.
TCP/IP	Transmission Control Protocol/Internet Protocol.

TEMPEST	Studies, inspections, and tests of unintentional electromagnetic radiation from computer, communication, command, and control equipment that may cause unauthorized disclosure of information; usually applied to DoD and security agency testing programs.
TILO	Technical and Industrial Liason Office—Qualified Requirement Information Program - Army.
TM	Time and Materials contract.
TOA	Total Obligational Authority (Defense).
TOD	Technical Objective Document.
TR	Temporary Regulation (added to FPR, FAR).
TRACE	Total Risk Assessing Cost Estimate.
TRCO	Technical Representative of the Contracting Offices.
TREAS	Department of Treasury.
TRP	Technical Resources Plan.
TSP	GSA's Teleprocessing Services Program.
TVA	Tennessee Valley Authority.
UCAS	Uniform Cost Accounting System.
USA	U.S. Army.
USAF	U.S. Air Force.
USCG	U.S. Coast Guard.
USMC	U.S. Marine Corps.
USN	U.S. Navy.
U.S.C.	United States Code.
USPS	United States Postal Service.
USRRB	United States Railroad Retirement Board.
VA	Veterans Affairs Department.
VE	Value Engineering.
VHSIC	Very High Speed Integrated Circuits.
VIABLE	Vertical Installation Automation BaseLine (Army).
VICI	Voice Input Code Identifier.
WBS	Work Breakdown Structure.
WGM	Weighted Guidelines Method.
WIN	WWMCCS Intercomputer Network.
WITS	Washington Interagency Telecommunications System.
WIS	WWMCCS Information Systems.
WS	Work Statement - Offerer's description of the work to be done (proposal or contract).
WWMCCS	World-Wide Military Command and Control System.

B**General and Industry Acronyms**

ADAPSO	Association of Data Processing Service Organization, now the Computer Software and Services Industry Association.
ADP	Automatic Data Processing.
ADPE	Automatic Data Processing Equipment.
ANSI	American National Standards Institute.
BOC	BELL Operating Company.
CAD	Computer-Aided Design.
CAM	Computer-Aided Manufacturing.
CBEMA	Computer and Business Equipment Manufacturers Association.
CCIA	Computers and Communications Industry Association.
CCITT	Comite Consultatif Internationale de Telegraphique et Telephonique; Committee of the International Telecommunication Union.
COBOL	Common Business-Oriented Language.
COS	Corporation for Open Systems.
CPU	Central Processor Unit.
DMBS	Data Base Management System.
DRAM	Dynamic Random Access Memory.
EIA	Electronic Industries Association.
EPROM	Erasible Programmable Read-Only-Memory.
IEEE	Institute of Electrical and Electronics Engineers.
ISDN	Integrated Services Digital Networks.
ISO	International Organization for Standardization; voluntary international standards organization and member of CCITT.
ITU	International Telecommunication Union.
LSI	Large-Scale Integration.
MFJ	Modified Final Judgement.
PROM	Programmable Read-Only Memory.
RBOC	Regional Bell Operating Company.
UNIX	AT&T Proprietary Operating System.
UPS	Uninterruptable Power Source.
VAR	Value Added Retailer.
VLSI	Very Large Scale Integration.
WORM	Write-Once-Read-Many-Times.



Policies, Regulations, and Standards

A

OMB Circulars	A-11	Preparation and Submission of Budget Estimates.
	A-49	Use of Management and Operating Contracts.
	A-71	Responsibilities for the Administration and Management of Automatic Data Processing Activities.
	A-76	Policies for Acquiring Commercial or Industrial Products and Services Needed by the Government.
	A-109	Major Systems Acquisitions.
	A-120	Guidelines for the Use of Consulting Services.
	A-121	Cost Accounting, Cost Recovery, and Integrated Sharing of Data Processing Facilities.
	A-123	Internal Control Systems.
	A-127	Financial Management Systems.
	A-130	Management of Federal Information Resources.
	A-131	Value Engineering.

B

GSA Publications	The FIRMR as published by GSA is the primary regulation for use by federal agencies in the management, acquisition, and use of both ADP and telecommunications information resources.
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C

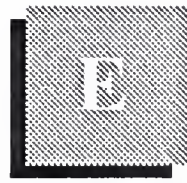
DoD Directives	DD-5000.1	Major System Acquisitions.
	DD-5000.2	Major System Acquisition Process.
	DD-5000.11	DoD Data Elements and Data Codes Standardization Program.
	DD-5000.31	Interim List of DoD-Approved High-Order Languages.
	DD-5000.35	Defense Acquisition Regulatory Systems.
	DD-5200.1	DoD Information Security Program.
	DD-5200.28	Security Requirements for Automatic Data Processing (ADP) Systems.

DD-5200.28-M	Manual of Techniques and Procedures for Implementing, Deactivating, Testing, and Evaluating Secure Resource Sharing ADP Systems.
DD-7920.1	Life Cycle Management of Automated Information (AIS).
DD-7920.2	Major Automated Information Systems Approval Process.
DD-7935	Automated Data Systems (ADS) Documentation.

D

Standards	ADCCP	Advanced Data Communications Control Procedures; ANSI Standard X3.66 of 1979; also NBS FIPS 71.
	CCITT G.711	International PCM standard.
	CCITT T.0	International standard for classification of facsimile apparatus for document transmission over telephone-type circuits.
	DEA-1	Proposed ISO standard for data encryption based on the NBS DES.
	EIA RS-170	Monochrome video standard.
	EIA RS-170A	Color video standard.
	EIA RS-464	EIA PBX standards.
	EIA RS-465	Standard for Group III facsimile.
	EIA RS-466	Facsimile standard; procedures for document transmission in the General Switched Telephone Network.
	EIA RS-232-C	EIA DCE to DTE interface standard using a 25-Pin connector; similar to CCITT V-24.
	EIA RS-449	New EIA standard DTE to DCE interface which replaces RS-232-C.
	FED-STD 1000	Proposed Federal Standard for adoption of the full OSI reference model.
	FED-STD 1026	Federal Data Encryption Standard (DES) adopted in 1983; also FIPS 46.
	FED-STD 1041	Equivalent to FIPS 100.
	FED-STD 1061	Group II Facsimile Standard (1981).
	FED-STD 1062	Federal standard for Group III facsimile; equivalent to EIA RS-465.
	FED-STD 1063	Federal facsimile standard; equivalent to EIA RS-466.
	FED-STDs 1005, 1005A-1008	Federal Standards for DCE Coding and Modulation.
	FIPS 46	NBS Data Encryption Standard (DES).
	FIPS 81	DES Modes of Operation.
	FIPS 100	NBS Standard for packet-switched networks; subset of 1980 CCITT X.25.
	FIPS 107	NBS Standard for local area networks, similar to IEEE 802.2 and 802.3.

FIPS 146	Government Open Systems Interconnection (OSI) Profile (GOSIP).
FIPS 151	NIST POSIX (Portable Operating System Interface for UNIX) standard.
IEEE 802.2	OSI-Compatible IEEE standard for data-link control in local area networks.
IEEE 802.3	Local area network standard similar to Ethernet.
IEEE 802.4	OSI-compatible standard for token-bus local area networks.
IEEE 802.5	Local area networks standard for token-ring networks.
IEEE P1003.1	POSIX standard, similar to FIPS 151.
MIL-STD-188-114C	Physical interface protocol similar to RS-232 and RS-449.
MIL-STD-1777	IP-Internet Protocol.
MIL-STD-1778	TCP - Transmission Control Protocol.
MIL-STD-1780	File Transfer Protocol.
MIL-STD-1781	Simple Mail Transfer Protocol (electronic mail).
MIL-STD-1782	TELNET - virtual terminal protocol.
MIL-STD-1815A	Ada Programming Language Standard.
SVID	UNIX System Interface Definition.
X.12	ANSI standard for Electronic Data Interchange.
X.21	CCITT Standard for interface between DTE and DCE for synchronous operation on public data networks.
X.25	CCITT standard for interface between DTE and DCE for terminals operating in the packet mode on public data networks.
X.75	CCITT standard for links that interface different packet networks.
X.400	ISO Application-level standard for the Electronic transfer of messages (electronic mail).



Related INPUT Reports

A

Annual Market Analyses

U.S. Information Services Industry-Specific and Cross-Industry Markets, 1988.

U.S. Information Services Vertical Markets, 1987.

U.S. Information Services Cross-Industry Markets, 1987.

Procurement Analysis Reports, GFY 1989-1994.

B

Industry Surveys

U.S. Information Services Industry, 1988.

Eighteenth Annual ADAPSO Survey of the Computer Services Industry

Directory of Leading U.S. Information Services Vendors, 1988.

C

Market Reports

Federal Midsized Systems Market, 1988-1993.

Federal Large-Scale Systems Market, 1988-1993.

Federal Software Markets, 1987-1992.

Federal Professional Services Market, 1989-1994.

Federal Systems Integration Market, 1988-1993.

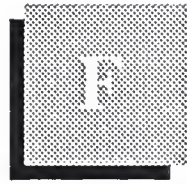
Federal Telecommunications Market, 1988-1993.

Federal Office Information Systems Market, 1988-1993.

U.S. Professional Services Market, 1989-1994.

Systems Integration Forecast and Trends, 1988-1993.

Systems Integration Competitive Analysis, 1989.



Questionnaire

CONFIDENTIAL

INPUT Questionnaire—Federal Agencies

Study Title: Federal Computer Equipment Market
(1991-1996)

Code: FICEM

Interview Type: ☐ Buyer ☐ Telephone
 ☐ User ☐ On-Site
 ☐ Policy ☐ Mail

Date: _____

Interviewer:

Respondent Name:

Title:

Phone:

Department:

Agency:

Address:

Office Code:

Function:

Referrals:

Thank you for your patience in completing this questionnaire. Please return this questionnaire by _____ in the enclosed envelope. You will receive an executive summary of this report.

AGENCY QUESTIONNAIRE

Federal Computer Equipment Market

This questionnaire is directed toward the federal government's acquisition and use of computer equipment, including microcomputers, workstations, midsize systems, mainframes, and supercomputers. This questionnaire is divided into three parts:

- Part I addresses agency past buying trends and currently installed systems.
- Part II addresses agency buying intentions.
- Part III addresses agency opinions and perceptions of the federal market for computer equipment.

Agency Environment

1. What type(s) of computers does your agency use? (Please check all that apply.)

Micros ___ W/S ___ Midsized ___ M/F ___ Super ___

- 2a. What is your approximate average annual equipment budget?
\$ _____

- 2b. Approximately how is it divided (by %)?

Micros ___ W/S ___ Midsized ___ M/F ___ Super ___
(Total should equal 100%)

- 2c. Can you divide your inventory by connections?

Standalone _____ LAN _____ WAN _____

3. Please check those applications that run on your computers:

	Micros	W/S	Midsized	M/F	Super
Information Analysis	_____	_____	_____	_____	_____
Human Resources	_____	_____	_____	_____	_____
Elec. Mail	_____	_____	_____	_____	_____
Elec. Publishing	_____	_____	_____	_____	_____
Logistics & Distrib.	_____	_____	_____	_____	_____
Scientific/Engineering	_____	_____	_____	_____	_____
Communications	_____	_____	_____	_____	_____
Word Processing	_____	_____	_____	_____	_____
Administrative	_____	_____	_____	_____	_____
Finance/Accounting	_____	_____	_____	_____	_____
Project Management	_____	_____	_____	_____	_____
Other ()	_____	_____	_____	_____	_____

4. Are any applications from larger computer systems now being done by:

a. Microcomputers? Yes ____ No ____ If so, what applications?

5. How do you acquire computers (please check all that apply)?

	Micros	W/S	Midsized	M/F	Super
Reqs. Contract	____	____	____	____	____
GSA Schedules	____	____	____	____	____
RFPs for Specific Purpose	____	____	____	____	____
Excess Equipment	____	____	____	____	____
Other ()	____	____	____	____	____

6. What impact have federal budgetary constraints had on your purchase of computers?

Agency Buying Intentions

7. New Procurements

a. Do you plan to buy any additional computers over the next three to five years?
Yes ____ No ____

IF NO, GO TO QUESTION __.

b. About how much do you expect to spend on new computer procurements annually?
\$ _____

c. Do you expect any one of the five equipment sizes to dominate your newly acquired systems? Yes ____ No ____ If yes, which one?

8. Please identify any application types (such as those listed in Question 3) that you expect to dominate newly acquired systems?

Agency Perceptions

9. On a scale of 1-5, with 5 being most important and 1 being least important, please rate the following computer selection criteria:

Criteria	Rating				
Equipment Performance	1	2	3	4	5
Software Features	1	2	3	4	5
Vendor's Federal Experience	1	2	3	4	5
Ease of Implementation	1	2	3	4	5
Vendor's Support Reputation	1	2	3	4	5
Product Price	1	2	3	4	5
Equipment Reliability	1	2	3	4	5
Other _____	1	2	3	4	5

- 10a. Do you have any opinion on the type of vendor or organization that appears most appropriate for providing computers to your agency?

Yes _____ No _____

- 10b. If yes, please check all that apply:

Manufacturers _____	Professional services firms _____
Software vendors _____	Systems integrators _____
Aerospace divisions _____	Not-for-profit firms _____
Other _____	Suppliers _____

11. Do you have a preference for one or more of the particular acquisition methods specified in Question 5?

Yes _____ No _____

If yes, please specify the method(s) preferred.

12. How are technology changes affecting your acquisition and use of computers?

13. How are industry or market factors (such as industry mergers, Japanese penetration) affecting your acquisition and use of computers?

14. How, if at all, have each of the following GSA initiatives affected your acquisition and use of computers?

- a. Trail Boss

- b. Increased delegation thresholds

c. Greater oversight

d. Other

15. Finally, in the last ten years, agencies have tended toward buying rather than leasing their computer systems. Do you expect any shift in this trend?

Yes _____ No _____

Why?

Thank you for your cooperation and assistance.

